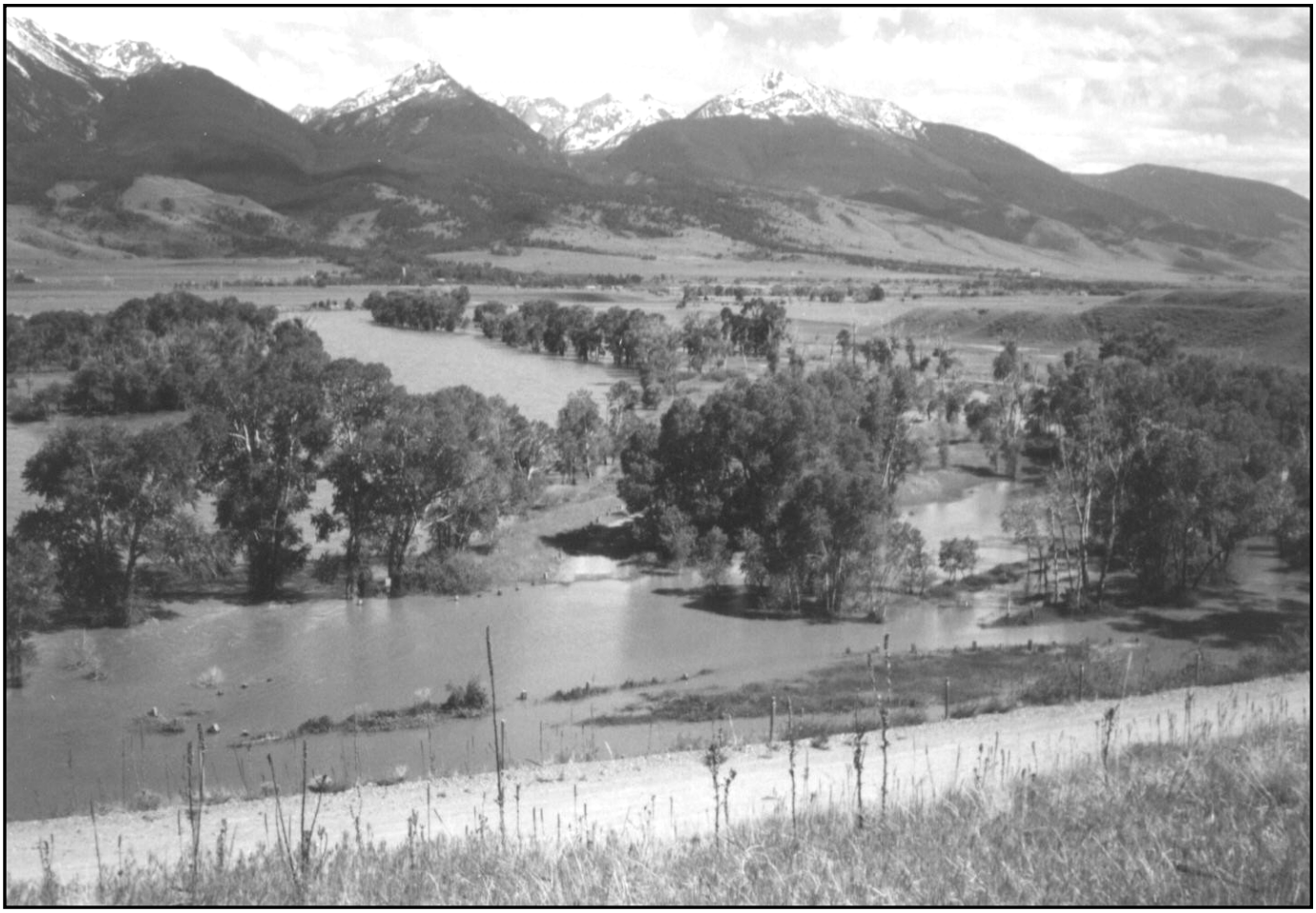
Governor's Upper Yellowstone River Task Force
Annual Report
2001



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For more information and monthly Task Force updates visit our web site at:
upperyellowstonerivertaskforce.org

This site should be up and running in February 2002.

Cover Photo: Upper Yellowstone River in northern Paradise Valley. Photo courtesy of the USGS.

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Governor's Upper Yellowstone River Task Force
5242 Highway 89 South
Livingston, Montana 59047

Dear Governor Martz: January 2, 2002

On behalf of the Governor's Upper Yellowstone River Task Force, I wish to thank you for reappointing us to an additional two-year term. The Task Force also wishes to express our gratitude for your two new member appointments—Andy Dana and Doug Ensign—both of whom have already positively contributed to our effort.

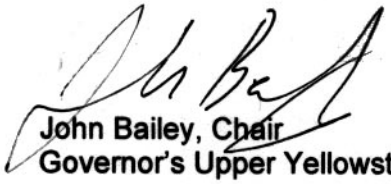
During 2001, the Task Force finished defining all the studies needed for a Cumulative Effects Investigation on the upper Yellowstone River. We were presented with preliminary data from two of our research investigations, and saw two fundamental mapping projects completed. In March and May of 2001, the Task Force hosted two educational workshops. These events allowed our research teams to show landowners and local residents what studies are being conducted, and what types of data are being collected on their properties. The workshops also allowed the public to ask questions of the researchers. This reflects how the Task Force is making every effort to educate ourselves alongside the public throughout our project's process. We hope that by staying well informed, the Task Force and the public will develop an understanding of what our research findings will be able to tell us about the river, and what those findings will not be able to tell us.

As is outlined in this *2001 Annual Report*, all of our study data collection and analysis will be completed by December 2002. Studies that will be completed include: Geomorphic Analysis, Hydrology/Hydraulic Analysis, Riparian Trend Analysis, Fisheries Analysis, Wildlife Analysis, Watershed Land Use Assessment, and Socio-Economic Assessment.

Preliminary research findings and analyses will be presented to the Task Force and public in late 2002 and early 2003, at which point data synthesis and recommendation development begin. The Task Force expects to deliberate over the study findings and ask questions of the data presented. In response to that dialogue, our Technical Advisory Committee will develop realistic physical and biological scenarios to address our questions.

Having listened and responded to the public and our agency partners over the past four years, Task Force members have witnessed this effort grow into a worthwhile river investigation with practical application both for Montana and our nation. We are thankful and appreciative of the patience and dedication shown by all parties involved, including the Governor's office. We look forward to the completion of the research investigations in 2002.

Best regards,



John Bailey, Chair
Governor's Upper Yellowstone River Task Force

Governor's Upper Yellowstone River Task Force

2001 Annual Report

The *2001 Annual Report* is the fourth in a series of yearly reports produced by the Governor's Upper Yellowstone River Task Force (here after referred to as the Task Force). The purpose of the report is to provide Montana's Governor and the general public with information on Task Force activities and accomplishments over the past year.

The main focus of this year's report is (1) to summarize our investigations and the informational products being created under Task Force sponsorship, and (2) to provide work projections for 2002. Past accomplishments of the Task Force and our overall goals are also briefly described in this report. Detailed information on previous Task Force activities may be found on our website at: upperyellowstonerivertaskforce.org, which should be up and running in February 2002; or are documented in our *1998*, *1999*, and *2000 Annual Reports,* which are available upon request.

In order to minimize repetition and the length of this report, we have used acronyms for commonly used phrases or agency titles. To assist readers unfamiliar with these terms, we have provided a list of acronyms and their definitions in *Appendix A.*

Task Force History and Purpose

In response to a request from the citizens of Park County, Montana's former Governor Marc Racicot created the Task Force in November 1997. County residents had experienced back-to-back, near 100-year floods in 1996 and 1997, and consequently recognized the need for a more comprehensive and consolidated planning effort for the upper Yellowstone River.

Following her predecessor's lead, Montana's current Governor Judy Martz reappointed the Task Force to a third and final, two-year term on August 21, 2001 (see *Appendix B. Executive Order No. 21-01*).

As directed by the Governor's executive order, the purpose of the Task Force is "to provide a forum for the discussion of issues that effect the Upper Yellowstone River Basin, particularly, to bring together landowners, sportsmen and sportswomen, and community leaders to develop a shared understanding of the issues and competing values and uses that impact the upper Yellowstone River." Further, the Task Force is directed to (1) bring together many diverse groups, who have an interest in the upper Yellowstone River, and (2) ensure that future projects affecting the river are planned and conducted in a manner that will preserve the integrity, beauty, values, and function of the upper Yellowstone River for Montanans now and in the future.

The Task Force functions as a structured non-regulatory organization that involves citizens, communities, and governmental agencies. The overall goal of the Task Force is to develop a set of publicly-supported river corridor management recommendations that address potential adverse cumulative effects of river channel modification, floodplain development, and natural events on the human community and riparian ecosystem.

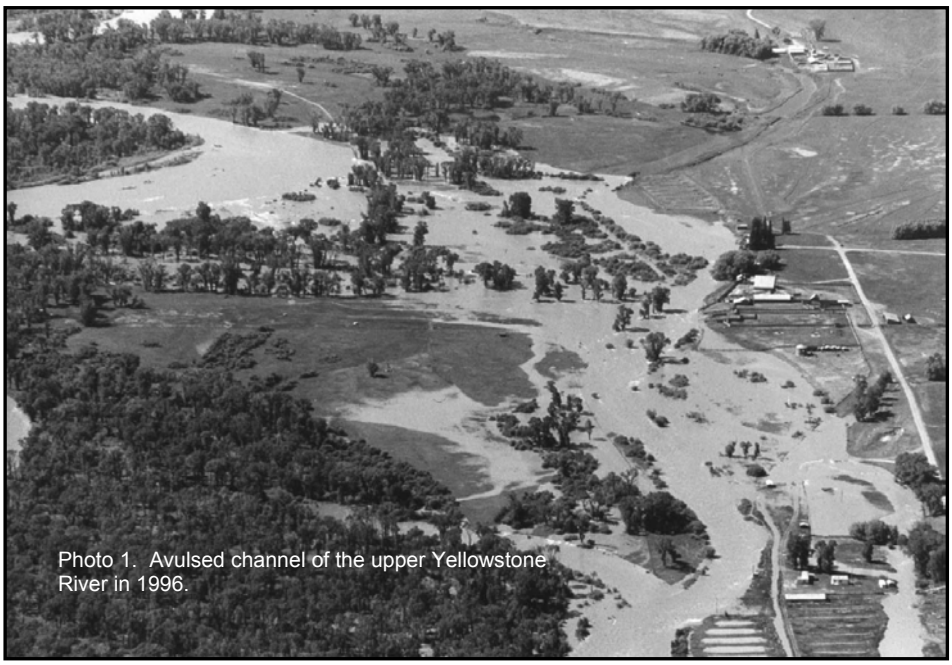


Photo 1. Avulsed channel of the upper Yellowstone River in 1996.

Who We Are

The Task Force is made up of a wide cross section of local area citizens, and local, state, and federal agency representatives. Individually, Task Force members represent specific constituencies within the local community; yet together, they form a balanced table of diverse groups strongly concerned about the natural and economic resources in the Upper Yellowstone River Basin.

> *"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has."* Margaret Mead

The Task Force was developed in the spirit of partnership and collaboration, and uses a consensus-based approach to decision making. We work to raise awareness of environmental issues, and encourage members of the community to get involved in all Task Force activities and to express their views openly.

The Task Force is set up with community participants functioning in a leadership role (see *Appendix C* for ground rules). The 12 voting Task Force members represent the following interests: local businesses, property owners, ranchers, the angling community, conservation group(s), Park County, City of Livingston, and Park Conservation District. The eight non-voting Task Force members represent the following governmental agencies: Montana Department of Environmental Quality, Montana Department of Natural Resources and Conservation, Montana Department of Transportation, Montana Fish Wildlife and Parks, National Park Service (Yellowstone National Park), US Army Corps of Engineers, and US Forest Service. Agency partners provide technical knowledge and assistance, in addition to their regulatory and land management input.

From the beginning, the Task Force recognized the need to consolidate efforts in the upper Yellowstone River area, and to avoid duplication of effort. The make up of the Task Force is testament to the power of seating concerned citizens groups and governmental agencies as collaborative investigators and decision makers. Having many of the interested parties and agencies charged with regulation of river resources represented on the Task Force, has streamlined much of our research and outreach efforts thus far. In addition, and perhaps more importantly, we are not producing a study that will simply sit on a shelf. Quite the opposite is our intent. By giving regulatory agencies a voice in the process, we are helping to insure that our management recommendations have practical regulatory application.

The Community Is Our Partner

Since 1997, the Task Force has worked to accomplish our mission in a consensus-building manner, which stresses education, cooperation, broad-based community involvement, and voluntary participation. Through monthly meetings and educational activities we have strived to reach out to the community, provided an opportunity for the public to participate in the process, and provided a forum for individuals and groups to express their views openly and in the spirit of teamwork.

Photo 2. Participants of the May 5th Task Force educational workshop.

Information gathered by the Task Force belongs to everyone. All data—survey results, maps, and publications—will be available for the public's use and may be viewed or acquired by visiting our website at: upperyellowstonerivertaskforce.org, or by contacting the Task Force and Park Conservation District offices.

Science-Based Approach to Watershed Assessment

Over the past four years, the Task Force has set in motion an interdisciplinary study effort to assess the cumulative effects of bank stabilization, channel modification, and natural events on the physical, biological, and cultural attributes of the upper Yellowstone River. This scientific data will help us achieve our overall goal of developing a set of river corridor management recommendations. The Task Force-sponsored investigation is a collaborative and comprehensive way to provide useful information that regulatory agencies, landowners, and the interested public may use to facilitate improved management of the river and flood plain.

Currently, the Task Force is conducting the research phase of the project. Our project time line and associated research strategy calls for collection and analysis of baseline information (biophysical and socio-economic) in the Upper Yellowstone River Study Area. Each study requires one to two years of baseline data collection and analysis, all of which will be completed by December 2002. As studies are completed, informational meetings will be held for the Task Force and public.

Next comes the project synthesis phase of the project, which will provide the insight and understanding necessary to link information from the independent research components into an integrated analysis of the cumulative effects of bank stabilization. The development of multiple-variable models for data synthesis began in late 2001, and will intensify in 2002 and early 2003.

The final project phase will be to develop management recommendations based on an integrated understanding of the upper Yellowstone River. This phase will be conducted in late 2002 and 2003. Educating the public, as well as Task Force members, landowners, and regulatory agencies becomes paramount at this point. As research results become available in late 2002, our focus will shift to (1) presenting and explaining those

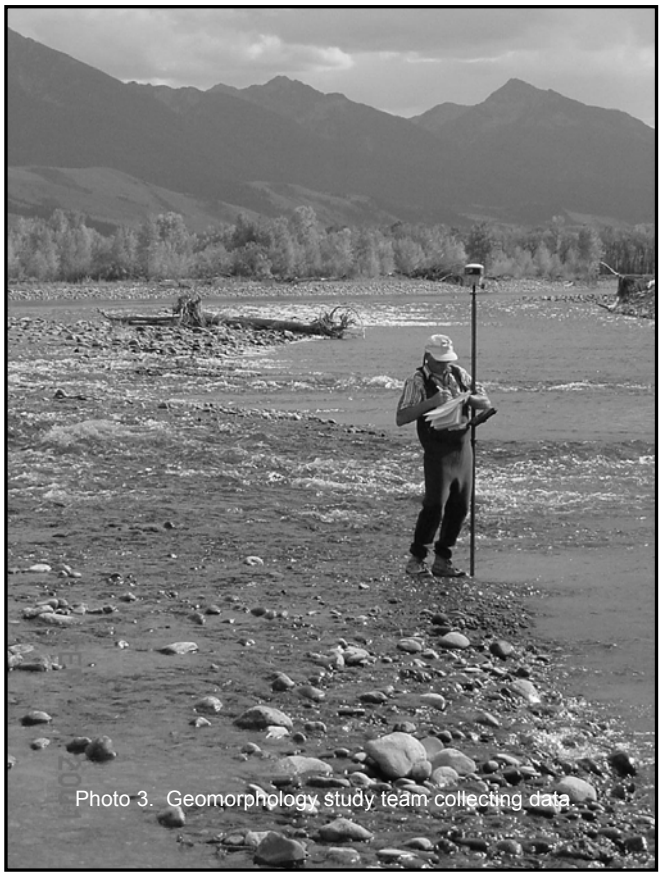


Photo 3. Geomorphology study team collecting data.

results, (2) identifying management recommendations based on those results, and (3) exploring and analyzing the possible effects of those recommendations on the long-term health of the river and the human community that depends on it.

Timely and intelligible dissemination of relevant information to the Task Force and public is an important aspect of the development of river management recommendations.

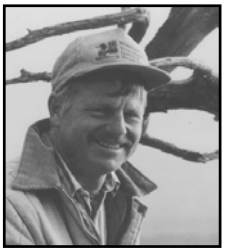
The goal of the Task Force is to make river management recommendations to Governor Martz in late August 2003. We will also present these recommendations to other entities such as, the Conservation Districts, Corps, DNRC, and DEQ. It is our intent that such recommendations will guide the decision-making process. With defensible science as the foundation for recommendations, and with ongoing input and review from the local community and regulatory agency partners, these recommendations will have practical application in the Upper Yellowstone River Basin.

Task Force Voting Member Profiles

In May 2001, Tom Lane and Mike Atwood resigned from the Task Force. The Task Force owes them both great thanks for a four-year commitment to our upper Yellowstone community effort. Their dedication and unique perspectives will be missed. In August 2001, Governor Martz appointed two new Task Force members: Andy Dana and Doug Ensign.

John Bailey, Chair, Fly Fishing Business Owner
John has been Chair of the Task Force for four years. He is the owner of the internationally renowned Dan Bailey's Fly Shop in downtown Livingston. Born and raised in Paradise Valley, John has been fishing the upper Yellowstone River for more than 40 years. His home is located on a lagoon along the Yellowstone River.

Mike Atwood, Former Vice Chair, Natural Resource Industry Representative
Mike Atwood has worked with natural resource and land management issues for more than 20 years with emphasis in forestry, large forestland acquisitions, and management. Mike and wife, Toni, own property and a vacation home along the Yellowstone River south of the Emigrant bridge.



Dave Haug, Present Vice Chair, Park Conservation District Supervisor
The Haug family has been farming and ranching in Park and Sweetgrass Counties for three generations, since the turn of the century. As a Supervisor for the Park Conservation District, Dave's Board issues 310 permits on the Yellowstone River; he is also a member of the City/County Planning Board and a board member of the Livingston Ditch Association, which uses water from the Yellowstone. Currently, his family farms and manages timber on their property in the Upper Yellowstone River Study Area.

Roy Aserlind, Emeritus Professor, University of Wisconsin-Madison
Roy grew up in Livingston and has owned a home on Ninth Street Island for 30 years, where he and his wife, Margot, now live the year around. Roy's concerns for the Yellowstone are all first hand, going back to the 1940s and1950s when there was concerted effort to build the Allenspur Dam. There were also problems created by gold dredging near Chico Hot Springs resulting in a constantly muddied river, and a spruce budworm spraying episode that resulted in a massive poisoning of the river's aquatic insect life. Roy feels that he understands and appreciates the health and fragility of riverine structures.

Andrew Dana, local property owner along the Yellowstone River
Andrew Dana's family owns a working ranch on the Yellowstone River. He is an attorney who specializes in protection of agricultural, open-space, and natural lands and represents local, regional, and national land conservation organizations, as well as landowners. He consults nationally on land conservation issues and currently serves on the Advisory Council of the Yellowstone Park Foundation.

Doug Ensign, local property owner along the Yellowstone River
Doug and his wife, Zena, own and operate the Mission Ranch, a cattle ranch that has been in the family for two generations. The Yellowstone River flanks the ranch on its northern end for a stretch of two miles. The ranch contains extensive Yellowstone River bottom lands and several spring creeks.

Michelle Goodwine, CRS, ABR, GSI; past president of the Montana Association of REALTORS®. Michelle has worked as a REALTOR® for 14 years and owns Coldwell Banker Maverick Realty. Michelle and her husband, Bob, are Livingston natives and live north of town on the Yellowstone River.

Tom Lane, former member, local property owner along the Yellowstone River
Long time residents of the Livingston area, the Lane family owns and operates cattle ranches throughout the state of Montana. Tom's family business includes a large operation and land holding along the upper Yellowstone River.

Jerry O'Hair, local property owner along the Yellowstone River
O'Hair family members are fourth generation Paradise Valley residents. Jerry owns and operates a working cattle ranch that adjoins the upper Yellowstone River for approximately three miles. The internationally famous Armstrong Spring Creek is also located on his ranch.

Brant Oswald, Conservation Group(s) Representative
Brant is a licensed Montana outfitter and co-manager of the Yellowstone Angler, a fly fishing shop in Livingston. He has served on the Board of Directors of both the Joe Brooks Chapter (Livingston) of Trout Unlimited and the Park County Environ-mental Council.

Rod Siring, local property owner along the Yellowstone River
Rod was born and raised in Montana, and he and his wife have spent the last 33 years in Park County. Rod is a retired Park Electric Cooperative manager, where he worked for 30 years. He enjoys fishing and boating on the Yellowstone.

Bob Wiltshire, Angling Community Representative
For more than 20 years, Bob has been closely involved with the fishery of the Yellowstone River. Employed by the Federation of Fly Fishers, Bob has 15 years of outfitting experience, a background in fishery management, is a frequent lecturer about fisheries issues, and contributes angling articles to a number of publications.

Ellen Woodbury, Park County Planner
Ellen has been the Park County Planning Director and Floodplain Administrator since 1992. She was nominated by the Park County Commissioners to represent the County on the Task Force. Ellen graduated from Montana State University and attended graduate school at Western Illinois University in Macomb, Illinois.

Jim Woodhull, City of Livingston Planner
Born and raised in Livingston, Jim has been with the Livingston City Planning Office since graduating from Montana State University, Bozeman in 1992.

Task Force
Non-Voting Member Profiles

Ken Britton, present District Ranger
John Logan, former District Ranger
USFS, Gallatin National Forest
Gardiner Ranger District,
Gardiner Montana

Liz Galli-Noble, Task Force Coordinator
Livingston Montana

Terri Marceron, District Ranger
USFS, Gallatin National Forest
Livingston Ranger District,
Livingston Montana

Tom Olliff, Chief, Branch of Natural Resources
NPS, Yellowstone National Park
Mammoth Wyoming

Laurence Siroky, Water Operations Bureau Chief
Montana DNRC
Flood Plain Program, Water Resources Division
Helena Montana

Allan Steinle, Montana State Program Manager
US Army Corps of Engineers, Regulatory Branch
Helena Montana

Stan Sternberg, Environmental Program Manager
Environmental Services
Montana Department of Transportation
Helena Montana

Joel Tohtz, Fisheries Biologist
Montana FWP
Livingston Montana

Dean Yashan, Watershed Coordinator
Montana DEQ
Planning, Prevention, and Assistance Division
Helena Montana

Technical Advisory Committee

The Task Force appointed a Technical Advisory Committee (TAC) in 1998. The TAC's role is (1) to assist the Task Force by offering scientific guidance, (2) to develop an integrated research program, and (3) to evaluate research proposals and results. The TAC is also taking the lead in data synthesis and interpretation of information for the Task Force.


Photo 4. TAC meeting.

The TAC is designed to provide recommendations to the Task Force, when requested, based on the results of the scientific investigations. The TAC is given both broad direction and specific missions by the Task Force, and has the flexibility to determine how best to accomplish its job. The TAC has no authority to make policy decisions or recommendations on behalf of the Task Force; rather, its role is to work as directed by the Task Force to ensure that (1) the right questions are asked, (2) the best approach and methods are used to answer questions, (3) the data collected are objective, defensible, and trustworthy, and (4) the answers provided are understandable and relevant.

As the Upper Yellowstone River Cumulative Effects Investigation has expanded over the past three years, so too has the TAC. Five individuals were officially appointed by the Task Force and form the nucleus of the committee. At present and reflecting the expansion of the overall project, the TAC has grown to include agency liaisons and research team principal investigators (see *Table 1* for list of TAC members). Thus, the TAC now fosters communication and data sharing amongst the


Photo 5. Task Force members.

independent research efforts, and insures that data synthesis will be possible in the next phase of this cumulative effects project.

Coordination and consistency between study components—particularly with respect to stratification and selection of sampling and detailed mapping sites (see *Map* 1 on page 28)—has been achieved through TAC oversight. In 2001, the full TAC met on five occasions. These formal meetings focused on project management, coordinating research study timelines, product delivery, data synthesis and modeling, and enhancing communications amongst our on-going investigations: topographic mapping, geomorphology, riparian vegetation, hydrology/hydraulics, fish populations, fish habitat, wildlife (bird), land use, and socio-economic.

In addition to study management, members of the TAC have provided the Task Force with a readily available scientific sounding board. TAC members have attended all nine Task Force meetings in 2001, giving study updates and answering research-related questions. The TAC also conducted two public outreach and education workshops early this year. These workshops provided a complete overview of the Cumulative Effects Investigation and detailed each research study being done.

Table 1. 2001 Technical Advisory Committee Members and Researcher Team Leaders

Name	Profession / Title	Agency / Affiliation
***Dr. Duncan Patten, Chair**	**Riparian Ecologist**	**Montana State University**
**Dr. Zack Bowen	Fish Habitat Research Team Leader	USGS-BRD
*Tim Bryggman	Economist	Montana DNRC
**Chuck Dalby	Geomorphology Research Team Leader	Montana DNRC
Liz Galli-Noble	Coordinator, Liaison	Task Force
Mike Gilbert	Environmental Resources Specialist	US Army Corps of Engineers
*Tom Hallin	Professional Surveyor	Private Survey Business
**Dr. Andy Hansen	Wildlife Research Team Leader	Montana State University
Rob Hazlewood	Wildlife Biologist	USFWS
**Steve Holnbeck	Hydraulic Analysis Research Team Leader	USGS-Helena
**Dr. Mike Merigliano	Riparian Trend Analysis Team Leader	University of Montana
**Chuck Parrett	Hydraulic Analysis Research Team Leader	USGS-Helena
**Tom Pick	Watershed Land Use Assessment Team Leader	NRCS
Jim Robinson	Geomorphology Research Team Leader	Montana DNRC
**Dr. Jay Rotella	Wildlife Research Team Leader	Montana State University
*Brad Shepard	Fisheries Biologist	American Fisheries Society
Allan Steinle	Environmental Resources Specialist	US Army Corps of Engineers
**Dr. Al Zale	Fish Populations Research Team Leader	Montana State University

* = TAC member officially appointed by the Task Force.
** = Research team leader

Upper Yellowstone River Study Area

The Upper Yellowstone River Study Area was defined for the Task Force in the Governor's Executive Order No. 19-97 as "that reach of river (including its tributaries), beginning at the Yellowstone Park boundary and extending downstream to the bridge crossing at Springdale," Montana. Flanked by the Crazy and Bridger Mountain Ranges to the north, the Absaroka Range to the east, the Gallatin Range to the west, and Yellowstone National Park to the south, approximately 85 miles of the Yellowstone River flows within this 2,930 square-mile basin (see *Map 2* on page 30).

The Upper Yellowstone River Basin represents a significant and valuable natural and economic resource for local area residents, citizens of Montana, and our nation as a whole. This unique ecosystem houses the Yellowstone River (the longest free flowing river in the lower 48 states), Yellowstone National Park, the Absaroka-Beartooth Wilderness Area, large populations of diverse wildlife, and viable and varied fish populations. It is home to more than 15,000 Montana residents and is visited by more than one million tourists each year.

The upper Yellowstone River, and its continued health, is essential to the local and regional economy. Park County, which makes up 2,667 square miles of this watershed, is largely supported by industries that rely heavily on the continued long-term health and well being of the Yellowstone River. Ranchers and farmers depend on the river to provide the elements necessary to sustain successful agricultural operations. They in turn provide the open space, wildlife and fish habitat, and scenic views that are enjoyed by the many other residents and visitors to the area.

Located in south central Montana, the upper Yellowstone River meanders through the heart of Park County. Park County is Montana's 12th most populous county. The city of Livingston is the county seat and the state's 11th largest city with approximately 8,500 residents. Most of Livingston's residents are directly affected by changes in the Yellowstone River, as it literally dissects the city from south to north. Channel modification has occurred with varying intensity throughout the study area. Relatively little channel modification has occurred between Gardiner and Mill Creek. A moderate amount of channel alteration has occurred between Mill Creek and Carters Bridge, and from Mission Creek to Springdale. The most intensive activity has occurred in the reach from Carters Bridge to Mission Creek.

Addressing TMDL

The section of Yellowstone River within our study area is considered to be a priority watershed for restoration and water-quality plan development by several agencies. A multi-agency advisory group led by the Montana DEQ and DNRC has identified the upper Yellowstone River as a Category 1-A watershed. Category 1-A watersheds have immediate restoration needs with one or more agency designations as a priority area, coupled with the existence of a local group (that is, the Task Force) that has identified technical assistance or funding needs[1]. Further, the 1998 §303 (d) list assigned the upper Yellowstone River a low priority for water-quality restoration plan and associated Total Maximum Daily Load (TMDL) development. That designation has been elevated, and in the 2000 Draft Revised §303 (d) list, the main stem of the upper Yellowstone River and three of its tributaries were assigned a high priority for plan development[2].

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[1] Source: October 1, 1998. *Assessment of Montana's Watershed Resource Needs; Clean Water Action Plan*. Montana Unified Assessment Work Group; subcommittee of the Montana Watershed Coordinator Council.

[2] The federal Clean Water Act section §303 (d) requires all states to compile a list of water quality limited water bodies, in need for Total Maximum Daily Load development. The list must be updated every four years and the Environmental Protection Agency and Montana Department of Environmental Quality are the monitoring authorities.

Upper Yellowstone River Cumulative Effects Investigation

Project Background

The Task Force was established in November 1997 and directed to bring together disparate community groups to discuss and develop a shared understanding of the issues and competing values and uses that impact the Upper Yellowstone River. The Task Force envisioned a study that would focus mainly on the river channel. Over time, however, other state and federal actions have necessitated a broader project scope. The catalyst for that change centers around two actions: (1) a Special Area Management Plan in 1998, and (2) a law suit over the cumulative impact portions of the 404 Corps permit decision documents on the Yellowstone River in 2000. The current river corridor study approach reflects a collaborative effort to address regulatory requirements where possible.

A corridor and floodplain approach has been maintained as the primary geographic study area for the project. However, cumulative impact analysis requires a broader, watershed-level project area. Consequently, watershed scale data have been included in the overall study design.

Special Area Management Plan (SAMP)

The Corps' involvement with the Task Force began in 1997 with their participation as an Ex-Officio member. Their role then expanded in 1998 with a Congressional authorization for the Corps to assess the effects of bank stabilization on the upper Yellowstone River by developing a SAMP *(*see *Appendix D* for details). Although somewhat rare, a Corps institutional response to the increase in permit activity is to initiate the development of a SAMP. In the case of the upper Yellowstone that increase in permits was a direct response to the 1996 and 1997 flood events.

A SAMP is a regulatory planning tool and process that allows the Corps to assess all permitting issues in a river corridor or watershed context, as opposed to evaluating permits individually on a case-by-case basis. Specific language within the appropriations bill (see box below) states that as part of the SAMP, the Corps would assess the long-term effects of bank stabilization, fully coordinate with the Task Force, apply a watershed-level approach to the management decision-making process, and potentially conclude the process with a general permit. General permits are the Corps' regulatory management tools for dealing with environmental cumulative impacts. These permits are designed to be updated every five years, thereby serving as monitoring and feedback tools. A determination of the Corps' final agency action will be based upon the results of the technical studies, synthesis of these data, and full public involvement throughout any decision process.

In the upper Yellowstone, the SAMP is complimented by the Task Force cumulative effects assessment. The SAMP will provide biophysical, social, and economic base line data, satisfying federal management plan needs. It will include a scope of analysis, cumulative impacts, evaluation of alternatives for river corridor planning, and development of a consensus-based river management strategy.

By using the SAMP as a proactive planning tool, the potential for future lawsuits will likely diminish. The SAMP goals and objectives are consistent with the Task Force charter under the Governor's executive order to develop a forum for comprehensive planning. The Task Force will play a lead role in developing

1999 Energy and Water Development Appropriations
Senate Report #105-206

The [Senate] Committee recommendation includes $320,000 for the Corps to initiate and complete the Yellowstone River special area management plan, Gardiner to Springdale, Montana, study which will assess the long-term effects of streambank stabilization. Information provided by the study should help in making timely decisions based on a watershed approach, and possibly result in a general permit for the area. The Committee expects that this effort will be coordinated with the Yellowstone river task force.

recommendations for future river corridor management recommendations, which the SAMP must ultimately embody. All recommendations or determinations will be based upon the technical studies and cumulative effects analysis in consultation with the Task Force. In this manner, procedural and substantive compliance with environmental regulations can be achieved.

Montana Council of Trout Unlimited et al (plaintiffs) v. US Army Corps of Engineers (defendant)

The second action concerning the Corps was a 404-Permit lawsuit on the Yellowstone River. The United States District Court (Billings Division) in a May 2000 decision granted the plaintiffs motion for summary judgment and directed the Corps to re-open the 14 permits challenged (seven of those permits within the upper Yellowstone River study area). The court directed the Corps to reevaluate the cumulative impact portions of permit decision documents and determine whether or not an environmental impact statement needs to be completed for each project. The Corps is currently reevaluating the permits to comply with the court order. This decision clearly illustrates the need for better baseline river data, in order to address cumulative impact analysis on the Yellowstone. The culmination of the Task Force and SAMP effort is satisfying both state and national needs.

Project Overview

The Task Force Cumulative Effects Investigation is a pilot project for the Yellowstone River. It is not an investigation that will help solve just one management or pollution problem; rather, it will provide information upon which many management decisions may be based. Baseline data on the seven major components of this river system (described below) will provide information to a wide array of river users and managers for years to come. This investigation could become a "bench mark" study and protocol for many other western river studies.

The overall goal of the Task Force is to develop a set of publicly-supported river corridor management recommendations that address potential adverse cumulative effects of river channel modification, floodplain development, and natural events on the human community and riparian ecosystem. Development of management recommendations will involve identification and evaluation of the river's natural and economic resources, in five major phases:

I. Resource data collection, analysis, and mapping.
II. Resource condition assessment.
III. Development and evaluation of management options.
IV. Selection of preferred options to achieve goals and objectives.
V. Preparation of management recommendations.

Guiding principles that stay consistent through all these phases are:

1. Science Led Effort
Provide complete and comprehensive scientific data, which will allow for better understanding of the issues, resources, and uses that affect the integrity of the Upper Yellowstone River Watershed.

2. Investigate Issues Specific to Upper Yellowstone River Corridor and Watershed
Help explain how and why key elements of the watershed and river corridor (natural and human-induced) have changed over time.

3. Develop Recommendations that have Practical Application
Provide the Task Force and regulatory agencies with the information and analytical techniques necessary to evaluate river channel and floodplain problems, and proposed solutions.

Integrated Project Design

In 1998, the Task Force TAC developed an interdisciplinary study design (see *Figure 1*) to assess the cumulative effects of bank stabilization, natural, and other channel modification on the physical, biological, and cultural attributes of the upper Yellowstone River. The investigation consists of seven interrelated research components:

1. Watershed Conditions and Land Use
2. Geomorphology
3. Hydrology and Hydraulics
4. Riparian Vegetation
5. Fish Habitat and Populations
6. Wildlife Habitat and Populations
7. Socio-Economic

The seven biophysical and social components, shown above, form a cascade in which the attributes of each successive (or parallel) component are affected by processes and interactions within or between previous components. This hierarchical relationship is illustrated in the integrated project design (*Figure 1*) and project timeline (see *Figure 2*).

Realistic physically and biologically based scenarios will be developed for analysis with TAC and Task Force oversight. These scenarios will provide the basis for analyzing the cumulative effects of different types and levels of bank stabilization and floodplain modification on the physical and biological environment. In this manner, scientifically sound predictions of how the river and its resources will likely change in response to a particular channel modification or series of modifications will be developed. These analyses will then be used as a basis to develop river corridor management recommendations.

Figure 1. Integrated Project Design for the Upper Yellowstone River Cumulative Effects Investigation
This conceptual model, developed by the Task Force Technical Advisory Committee, shows the links amongst the seven interrelated components in the upper Yellowstone River investigation.

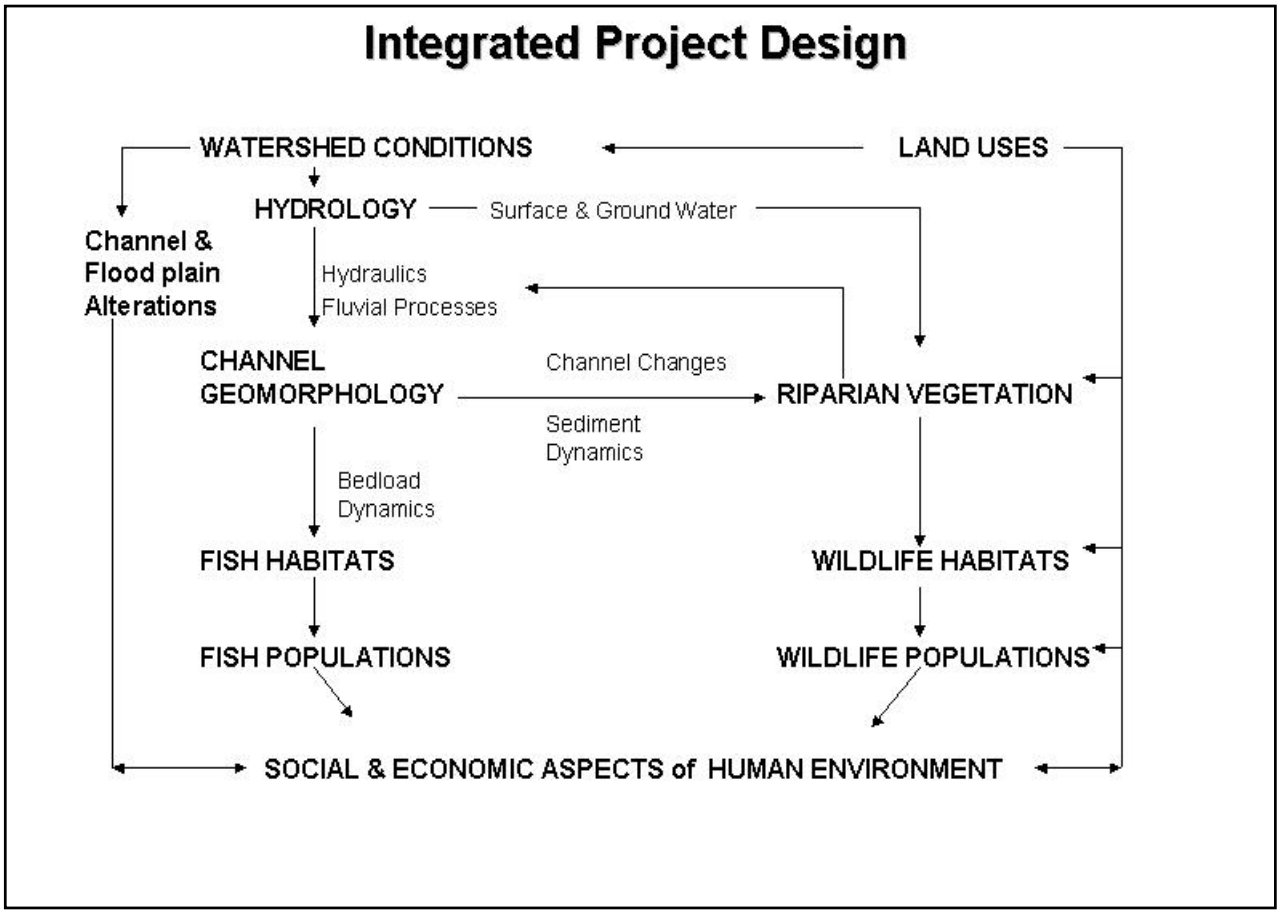
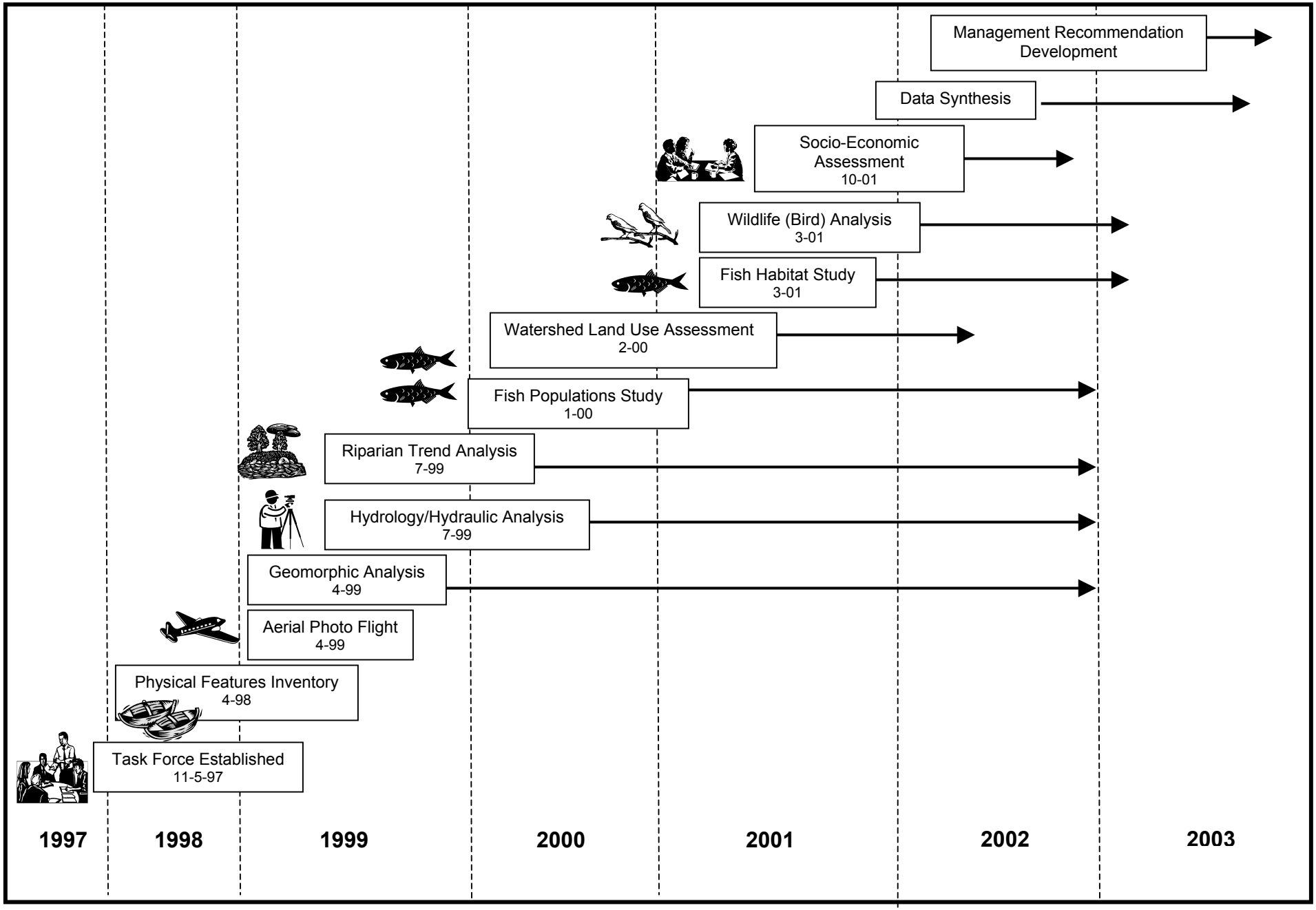


Figure 2. Governor's Upper Yellowstone River Task Force Project Time Line



Research Component Status Report
2001

Seven Research Components of the Cumulative Effectives Investigation

1. **WATERSHED CONDITIONS AND LAND USE**
    - **A. Yellowstone River Physical Features Inventory**
    - **B. Aerial Photography**
    - **C. National Wetland Inventory—Riparian/Wetlands/Land Use Mapping**
    - **D. Watershed Land Use Assessment**
    - **E. Contour/Topographic Mapping**

2. **GEOMORPHIC ANALYSIS**

3. **HYDROLOGY AND HYDRAULIC ANALYSIS**

4. **RIPARIAN TREND ANALYSIS**

5. **FISHERIES ANALYSIS**
    - **A. Fish Populations Study**
    - **B. Fish Habitat Study**

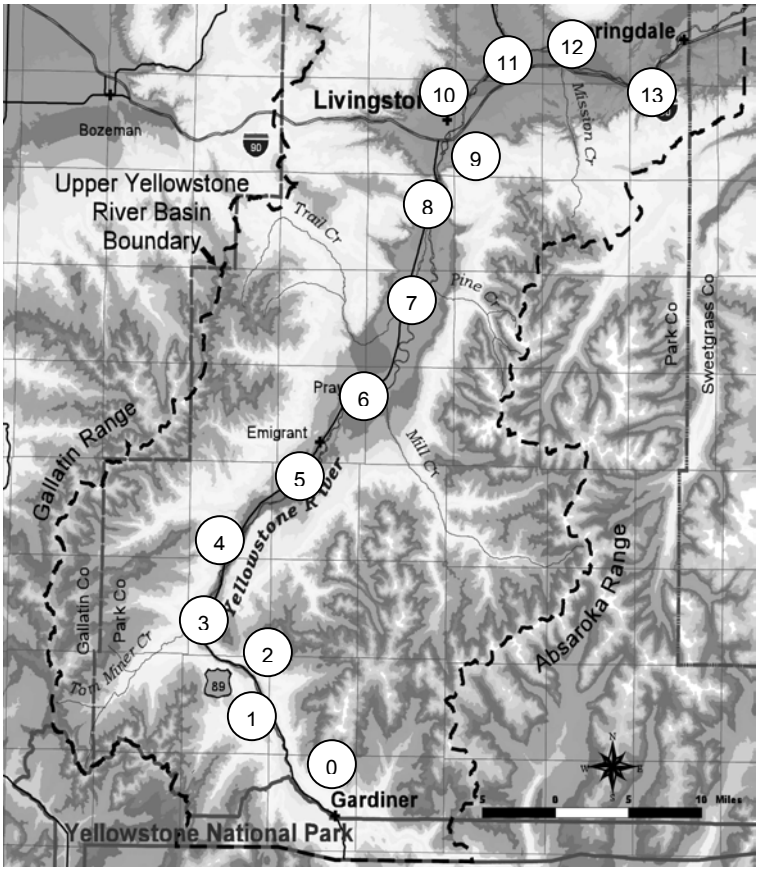
6. **WILDLIFE (BIRD) ASSESSMENT**

7. **SOCIO-ECONOMIC ASSESSMENT**
    - **Phase I: Socio-Economic Foundation**

"For every action, there is an equal and opposite reaction. In the case of rivers, the action is often singular, yet the reaction is complex and involves multiple variables which cannot be accurately predicted."

"The precise morphology of every river bend is both varied and indeterminate because it is the unique result of the bend's history of flow events, variations in channel alignment, and nature of the materials encountered at the outer bank."

A.J. Markham and C.R. Thorne



Map 3. 1998 Yellowstone River Inventory Segment Location Map

Segment 13—Pig Farm to Springdale
Segment 12—Shields River to Pig Farm
Segment 11—Mayors Landing to Shield River
Segment 10—Park Clinic to Mayors Landing
Segment 9—Carters Bridge to Park Clinic
Segment 8—Pine Creek to Carters Bridge
Segment 7—Loch Leven to Pine Creek
Segment 6—Emigrant to Loch Leven
Segment 5—Gravel pit to Emigrant
Segment 4—Carbella to gravel pit
Segment 3—Yankee Jim to Carbella
Segment 2—Corwin Springs to Yankee Jim
Segment 1—McConnell to Corwin Springs
Segment 0—Gardiner River to McConnell

Table 2. Segment Gradient

Segment	Length (feet)	Elevation Change (feet)	Gradient (%)	Feet/Mile
0	19,625	85	0.43	22.9
1	24,450	50	0.20	10.8
2	31,005	75	0.24	12.8
3	18,700	50	0.27	14.1
4	36,720	25	0.07	3.6
5	68,690	60	0.09	4.6
6	61,575	145	0.24	12.4
7	34,050	78	0.23	12.0
8	41,170	119	0.29	15.3
9	23,460	62	0.26	13.9
10	9,200	25	0.27	14.3
11	30,600	76	0.25	13.1
12	35,721	78	0.22	11.5
13	41,571	97	0.23	12.3

1. WATERSHED CONDITIONS AND LAND USE

1A. Yellowstone River Physical Features Inventory

Title: Yellowstone River Physical Features Inventory–Gardiner to Springdale

Principal Investigator: Thomas Pick (Water Quality Specialist)
NRCS, Bozeman Montana

Other Participants: Task Force members, FWP, USFS, DNRC, MDT, Corps, local area outfitters, and consulting firms.

Goal: Compare the degree of change in specific physical features within the upper Yellowstone River corridor from past (1987) to current (1998) conditions. The physical features inventory was conducted as a first step in understanding cause and effect relationships in the Upper Yellowstone River Study Area. The results of this inventory have served as a prioritization tool to guide further data acquisition and analysis efforts by the Task Force.

Completion Date: 1998.

Product: Hard copy or electronic published document *Yellowstone River Physical Features Inventory–Gardiner to Springdale*.

Access to Data: The physical features inventory may be viewed in an interactive application by visiting the Natural Resources Information System web site: http://nris.state.mt.us/webap/document/user.html .

1B. Aerial Photography

On April 11, 1999, low-flow (1,500 cubic feet per second) aerial photos of the upper Yellowstone River corridor were flown for the Task Force. The river corridor was flown at three scales: 1:6000, 1:8000, and 1:24000. Stretches of the river with greater channel complexity and/or more development in the flood plain were flown closer to the ground (1:6000- and 1:8000-scale), in order to show greater detail. These photos are the basis for two mapping projects: orthophoto quad maps and contour/topographic maps, which are described in detail in the *Topographic Mapping* section of this report.

Photo 6. 1:24000-scale aerial photo of the Interstate 90 bridge crossing the Yellowstone River.

Completion Date: Fall 1999.

Product: 1:6000, 1:8000, and 1:24000 aerial photos.

Access to Data: Copies of aerial photos can be purchased through the Task Force and Park Conservation District offices.

1C. National Wetlands Inventory—Riparian/Wetlands/Land Use Mapping

Title: Riparian, Wetlands, and Land Use Mapping for the Yellowstone River Corridor: Gardiner to Springdale, Montana

Principal Investigator: Chuck Elliott (Regional Coordinator)
US Fish and Wildlife Service, National Wetlands Inventory, Denver Colorado

Other Participants: Mike Gilbert, US Army Corps of Engineers
Omaha District, Omaha Nebraska

Goal: Document land use and land cover within the Upper Yellowstone River Study Area corridor.

Objectives:

1. Document current baseline conditions.
2. Assist in impact assessment and alternatives analyses for Task Force and interagency needs.
3. Serve as supporting data for other environmental investigations.
4. Provide a basis for future monitoring as needed.

Progress: Digital maps of riparian, wetland, and land use themes were completed for the study corridor. Mapping was based on photo-interpretation of August 1999, 1:24000 color infrared aerial photography. Draft photo-interpretation was completed in winter 1999/2000. Ground truthing of this information and quality control were conducted by the USFWS National Wetlands Inventory team in conjunction with interagency personnel from May 7 to 10, 2000. Final photo-interpretation was completed on October 20, 2000. The corridor consists of portions of 14 USGS 7.5 minute quadrangles covering the Yellowstone River Valley from the northern boundary of Yellowstone National Park to the Springdale bridge. The lateral boundary begins for both sides of the Yellowstone River at the 5,400-foot contour and ends at the 4,300-foot contour. Funding was provided by the USFWS and Corps, Omaha District.

Completion Date: June 2001.

Product: 1:24000-scale riparian, wetlands, land cover data themes. Final report dated July 2001.

Access to Data: This data is available for downloading via the NWI Center in St. Petersburg, Florida at: www.nwi.fws.gov.

1D. Watershed Land Use Assessment

Title: Upper Yellowstone River Watershed Land Use Assessment

Principal Investigators: Thomas Pick (Water Quality Specialist)
Doug Harrison (State Resource Inventory Specialist)
NRCS, State Office, Bozeman Montana

Dr. Richard Aspinall (Director)
Geographic Information and Analysis Center, Montana State University
Bozeman Montana

Goal: Depict the extent and spatial relationships of present (1999) and past (1970s) land cover/use in the Upper Yellowstone River Study Area.

Objectives:

1. Analyze and evaluate the relationships between four aspects of watershed integrity (hydrologic function, water quality, soil characterization, and upland wildlife habitat) and land cover/use change, as appropriate.
2. Provide resource management evaluations as appropriate related to land cover/use change and watershed function.
3. Serve as a supporting data layer for incorporation with other environmental studies.

Analysis Study Methods: Aerial photos and satellite imagery will be processed to characterize land cover/use classifications. The assessment will take place at two concurrent levels of study. The greater watershed area (Upper Yellowstone HUC 10070002 excluding the Boulder River and Shields River drainages and including the Yellowstone Headwaters HUC 10070001) will be characterized at a 1:100000-scale. Land cover/use within the valley floor area will be characterized at a scale of 1:24000. Additional data layers (soil, digital elevation) will be utilized as available.

Image analysis software will be used to perform an unsupervised classification of satellite data sets with limited field verification. Data cluster sets developed through this process will undergo a ground truth process to recognize the signature of selected land cover/use categories [NRCS Natural Resources Inventory (NRI)]. Final classification (present time) may require filters, stratification and/or additional ground truth verification for accuracy.

Analysis, Evaluation, and Results: NRCS staff specialists will summarize, evaluate, and prepare comments (as appropriate) based on professional interpretation in accordance with the objectives outlined above. A draft report and maps will be prepared for the Task Force and TAC review, prior to finalization.

Progress: Image preparation, classification, ground truthing, and final stratification rules have been applied to a Landsat 7, 30-meter image dated July 12, 1999. Image properties and poor resolution for the 1970s era photography and imagery yielded unacceptable results relative to the desired accuracy. GIAC prepared a Landsat 5, 30-meter image dated July 13, 1985 for the same area. Due to excessive cloud cover and confusion in the pixel-to-pixel classification, this product was also precluded from use in depicting accurate land cover/use change.

A draft report and watershed map defining the 1999 (present) land cover/use classification was prepared for TAC comment in fall 2001. Report and project files will be available on CD-ROM in January 2002.

An evaluation of the method and expense to complete a photo interpretation-based change process for the valley floor area was prepared and submitted to the Task Force for their consideration.

Future Work: The final project report is awaiting completion of the Park County digital soil survey mapping and database expected in March 2002. Incorporation of the digital mapping and database will

allow fulfillment of the objectives relative to the 1999 classification.

Projected Completion Date: March 2002.

Products:
1. Upper Yellowstone River Watershed 1999 Land Cover/Use Classification Report.
2. Watershed Land Cover/Use Assessment report, tables and maps.

1E. Contour/Topographic Mapping

Title: Topographic Mapping of the Upper Yellowstone River Channel and Floodplain from Gardiner to Springdale, Montana

Principal Investigator: US Army Corps of Engineers, Omaha Nebraska

Other Participants: Region 1 Engineering, US Forest Service, Missoula Montana
US Geological Survey, Water Resources Division, Helena Montana
Water Management Bureau, Montana DNRC, Helena Montana

Goal: Acquire ground-controlled aerial photos suitable for topographic and orthographic mapping of the contemporary upper Yellowstone River channel and flood plain; prepare digital orthophotos and topographic maps suitable for floodplain and other resource delineation.

Objectives:
1. Establish horizontal and vertical control for aerial photography.
2. Acquire low-flow, 'leaf off', 1:24000-scale aerial photography for the channel from Gardiner to Springdale for use in orthophoto preparation.
3. Acquire low-flow, 'leaf off', large scale (1:6000- or 1:8000-scale) aerial photography for the channel from Point of Rocks to Mission Creek for use in preparing two- and four-foot contour maps of the channel and flood plain.
4. Prepare orthophotos and contour maps using digital photogrammetric methods.

Progress: Topographic mapping of the river channel and floodplain provides the basic framework for describing contemporary river channel and flood plain resources, evaluating historic channel changes, hydraulic floodplain delineation, and monitoring future channel change. Contemporary topographic mapping at 1:6000 and 1:8000 scales is being accomplished using surveyed ground control and photogrammetric methods with photos obtained on April 11, 1999.

The US Forest Service completed preparation of 1:12000-scale orthophoto coverage of the study area in November 2000. The Corps assumed responsibility for production of contour maps in December 2000. Priority reaches were delivered to project researchers in September 2001. Final deliverables for all reaches will be available in January 2002.

Completion Date: Contour data will be used for production of study floodplain maps. The USGS-WRD and Corps will be cooperating for this data development. These contour data are also to be used by the fisheries, geomorphology, and riparian trend analysis study teams**.**

Products: Digital orthophotos of the study area (Gardiner to Springdale). Digital topographic maps of the river and flood plain from Point of Rocks to Mission Creek. Study floodplain maps.

Access to Data: Currently, access to preliminary data is limited to study researchers. Final map products will be released once approval is secured from the original contracting agencies in consultation with the Task Force. Pursuing formal adoption of final floodplain maps will be the responsibility of the DNRC and Park County.

2. GEOMORHIC ANALYSIS

Title: Historical Channel Changes and Geomorphology of the Upper Yellowstone River

Principal Investigators: Chuck Dalby (Hydrologist) and Jim Robinson (Geologist)
Water Management Bureau, Montana DNRC, Helena Montana

Other Participants: Larry Dolan, and Mike Roberts (Hydrologists)
Dr. Jane Horton (GIS/Range Management)
Water Resources Division, Montana DNRC, Helena Montana

Dr. Michael Merigliano and Mary Louise Polzin (Riparian Ecologists)
University of Montana, School of Forestry, Missoula Montana

Goal: Develop a quantitative framework for evaluating historic river channel changes and the physical effect that historic channel modification (for example, bank stabilization measures) may have had on the river and flood plain; also provide a partial basis for estimating the potential cumulative effect of contemporary river management alternatives.

Objectives:

1. Channel and floodplain mapping.
2. Geomorphic channel description and classification.
3. Mapping and analysis of historical channel changes.
4. Geomorphic analysis of historic channel processes and cumulative effects of channel modification.

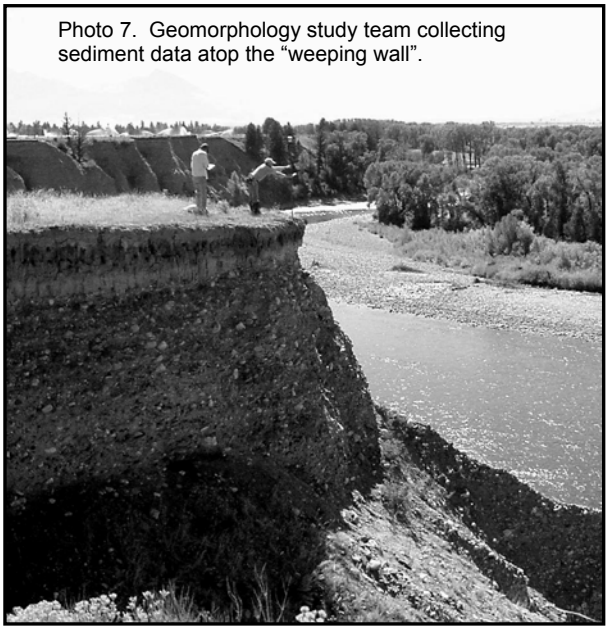


Photo 7. Geomorphology study team collecting sediment data atop the "weeping wall".

Methodology: This project uses a variety of scientific methods to map contemporary (1999) river channel and floodplain features, delineate historic river channel changes, and examine the relationship between historic channel modifications (for example, levees and bank stabilization) and channel changes. The information will be used to assess cumulative effects of channel modifications on physical attributes (channel geometry, plan pattern, bed-material characteristics) of the upper Yellowstone River from Gardiner to Springdale.

(1) Topographic and orthographic mapping of the river channel and flood plain provides the basic framework for describing and classifying current river channel and floodplain attributes (for example, channel pattern, width, slope), evaluating historic channel changes, and monitoring future channel change. Contemporary orthophotos (April 11, 1999), at small (1:24000) and large (1:6000 to 1:8000) scales, are being used as a base to map and describe a variety of physical channel features (for example, hydraulic units, gravel bars, islands, sediment sources and availability, bed and bank material, bank vegetation, channel modifications, woody debris, and civil works). Mapping of contemporary fluvial geomorphology is being accomplished through field mapping supplemented by stereo interpretation of aerial photography.

(2) Geomorphic classification of the upper Yellowstone River provides a framework for understanding the relationship between the form and condition of the channel and the physical and biological processes that shape and maintain its bed, banks, and island complexes. Reconnaissance-level classification(s) of the channel from Gardiner to Springdale will be delineated at 1:24000-scale, through air-photo interpretation and field reconnaissance. The Rosgen, Montgomery-Buffington, and Nanson-Croke channel classifications will be applied in cooperation with other investigators. These classifications serve as a

basis for identifying homogeneous channel segments, assessing relative vertical and lateral channel stability, and identifying geomorphic strata from which representative samples can be extracted for further detailed study. Channel classification information may also be used to tailor regulatory permits and actions to site-specific river channel conditions. More refined channel classification will be developed for the detailed study segment (Point of Rocks to Mission Creek) based on higher resolution channel mapping and field description of fluvial features. For channel segments with sufficient historic aerial photo coverage, a quantitative classification based on rates of lateral (and where possible) vertical change will be developed.

(3) Mapping and analysis of historical river channel changes provides a factual basis for describing how the upper Yellowstone River has changed over time and will give insights into likely future channel changes. Systematic examination of the spatial and temporal distribution of channel changes in relation to historic channel forming flows, channel modifications, and other factors provides a basis for assessing the cumulative effect of channel modifications over time. Reconnaissance-level, historic river channel changes are being estimated for the channel extending from Gardiner to Springdale, by comparing successive maps of the same channel reach over time. Contemporary (1999) 1:24000-scale mapping is being compared with historic USGS 1:24000-scale mapping (1950s and 1980s) that is available for the project area. More detailed analysis of historic channel changes, using historic aerial photos, will be done for selected sites within detail study reaches.

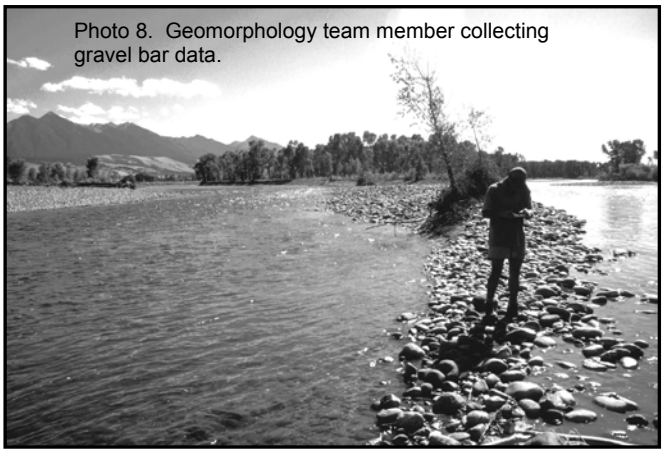


Photo 8. Geomorphology team member collecting gravel bar data.

(4) Hypothesis tests and other statistical methods, applicable for comparison of control and treatment populations, will be used to assess the historic effects of channel modifications. A sediment-budget analysis that quantifies floodplain and channel sediment sources, and storage reservoirs will be developed for selected reaches in the detail study segment. For channel segments with sufficient information, the following will be defined: sources of sediment and rates of production, storage reservoirs and their relative activity, and the net sediment balance of the channel segment for discrete intervals of time. Contemporary (1999) channel morphology and stability will be analyzed using various geomorphic methods. Areas of historic, existing, and likely future channel instability (lateral or vertical) and potential areas of rapid future channel change (channel cutoffs and avulsions) will be identified. This analysis provides a means for defining channel reaches that may be especially sensitive to increases in coarse sediment inputs or modification of channel width or slope. A hydraulic model developed for floodplain delineation (USGS-WRD) within the detailed study segment will also be used to evaluate historic cumulative effects of channel confinement on water-surface elevations of floods. A sediment-transport model will be used to examine potential cumulative effects, of hypothetical scenarios for channel management /stabilization, on channel characteristics and stability (USGS-WRD).

Progress: Most of the fieldwork has been completed and Objectives 1, 2, and 3 are in various states of completion. Currently our effort is focused on the detailed analysis of historic channel changes. The utility of historic photo and map information was evaluated based on temporal and spatial coverage, quality of imagery and accuracy of mapping, and temporal proximity to historic channel forming flows; the extent of aerial photos was inventoried in cooperation with other project investigators, and the following years were selected for acquisition and use: 1948-49, 1954, 1965, 1973, 1976, 1983, 1991, and 1999. Information on channel changes for selected reaches will be obtained by digitizing the trace of channel features from geo-referenced images of the historic aerial photos. Successive traces of features will then be overlain and analyzed using GIS methods.

Future Work: Data reduction and analysis will continue and additional fieldwork will be conducted in the winter (for example, bank mapping) and spring (ground truth) of 2002. We are seeking additional funding

(approximately $30,000) to prepare maps of major eroding banks (for example, the Weeping Wall) over time (using photogrammetry) and provide the information necessary to estimate sediment contributions to the channel.

Projected Completion Date: December 2002.

Products: A series of interim project reports are being prepared to convey project results to other investigators and the public, as the project progresses. The reports will be summarized into an overall completion report at the project's end. In addition to these reports, specific GIS map work products are being developed and are listed below. All spatial information (for example, topographic maps and interpretive maps) will be available in digital Arc Info/ArcView or AutoCAD 2000/LDD2 formats.

Photo 9. Geomorphology team conducting bed and bank material characterization.

GIS /Map Products *(in progress)*

(1) *Reconnaissance-level fluvial geomorphology and channel classification of the upper Yellowstone River from Gardiner to Springdale Montana.*
This GIS product consists of several themes (map layers) delineating physical channel features (channel, gravel bars) and geomorphic channel classification (1:24000- to 1:12000-scale).

(2) *Reconnaissance-level historical channel changes of the upper Yellowstone River from Gardiner to Springdale, 1948 to1999.*
This GIS product consists of several themes that delineate channel features (channel, gravel bars) in the study area at successive points in time (1948, 1977 or 1980, and 1999) and describe lateral channel changes (1:24000-scale)

(3) *Fluvial geomorphology and channel characteristics of the upper Yellowstone River from Point of Rocks to Mission Creek.*
This GIS product consists of several themes (map layers) that describe the fluvial geomorphology of the river and flood plain (1:6000- and 1:8000-scale).

(4) *Historic channel changes of selected reaches of the upper Yellowstone River: Point of Rocks to Mission Creek*.
This GIS product consists of several themes (map layers) that describe historic channel changes, based on mapping of geo-referenced historic aerial photos of selected channel segments.

Interim Project Reports *(in progress)*

Description of bed-material at selected sites along the upper Yellowstone River.
This report will present qualitative and quantitative data collected on the surface and subsurface size distribution of bed-material within the active channel. Sampling methods and sites are given along with GIS themes that locate the information.

Retrospective analysis of historical channel changes of the upper Yellowstone River.
Statistical and geomorphic analysis report accompanying above GIS map.

Sediment budget analysis of upper Yellowstone River: 1948 to 1999.
Presents methods, data, and results of morphometric sediment budget analysis that identifies sediment sources and volumetric rates of transfer for selected channel reaches.

3. HYDROLOGY AND HYDRAULIC ANALYSIS

Title: Analysis of Hydraulic Characteristics, Flood Plain Delineation, and Sediment-Transport Investigations for the Upper Yellowstone River from near Gardiner to Mission Creek in Park County, Montana

Principal Investigators: Steve Holnbeck (Hydraulic Engineer), Chuck Parrett (Supervisory Hydrologist)
US Geological Survey, Water Resources Division
Montana District Office, Helena Montana

Other Participants: Dave R. Johnson (Senior Hydrologic Technician). Other staff within the Montana District as required, and USGS technical experts outside the District on a consultation basis.

Goal: Analyze the potential effects of seasonal runoff, and river management and bank stabilization alternatives on sediment load, channel geometry, streambed profiles, and water surface elevations. Collect selected hydraulic and sediment data to support the modeling effort. Develop a floodplain delineation map.

Objectives:

1. Obtain channel geometry data at approximately 140 cross sections for the reach from Point of Rocks to the mouth of Mission Creek.
2. Delineate 100-year flood limits from Gardiner to Springdale. For the reach from Point of Rocks to Mission Creek, delineate the 100-year flood plain and floodway, and 500-year flood plain.
3. Sample bedload and suspended-sediment gradation and concentration, and perform other related data-collection efforts to characterize the sediment being transported in the Upper Yellowstone River Basin and to support modeling efforts.
4. Perform hydraulic and sediment-transport modeling to estimate relative changes in channel geometry, streambed profiles, and water surface elevations resulting from different sediment loads and water discharges.

Methodology: Survey river cross sections utilizing boats and ground crews, surveying equipment including conventional self-leveling level and electronic total station, and global positioning system (GPS) techniques. Apply the one-dimensional capabilities of the computer model HEC-RAS to perform water-surface profile analysis for floodplain delineation. Collect sediment-related data utilizing USGS field and laboratory resources, techniques, and equipment. Use the mobile-bed sediment transport model BRI-STARS in a one-dimensional fashion to evaluate sediment-transport issues for various flood hydrographs and certain river management scenarios. Emphasis of BRI-STARS work will be placed on relative comparison of modeling results.

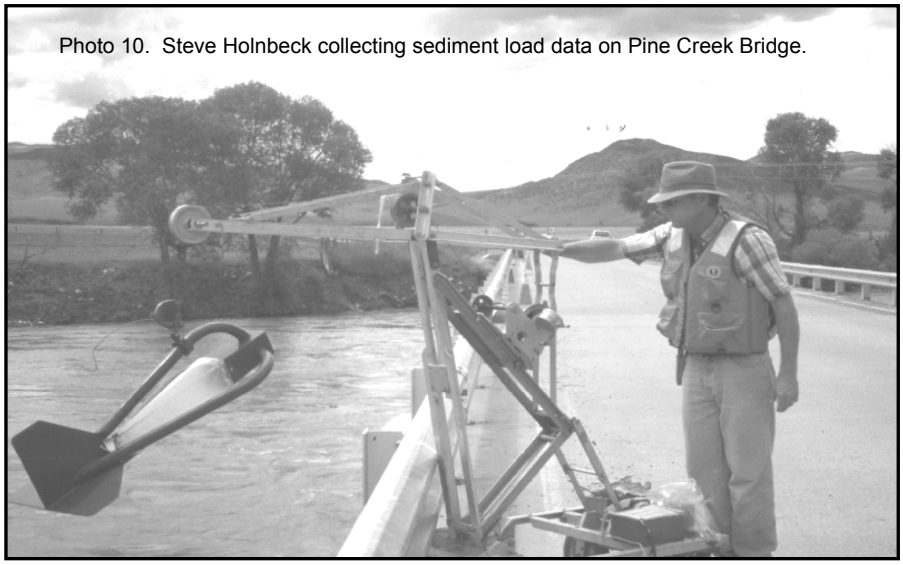


Photo 10. Steve Holnbeck collecting sediment load data on Pine Creek Bridge.

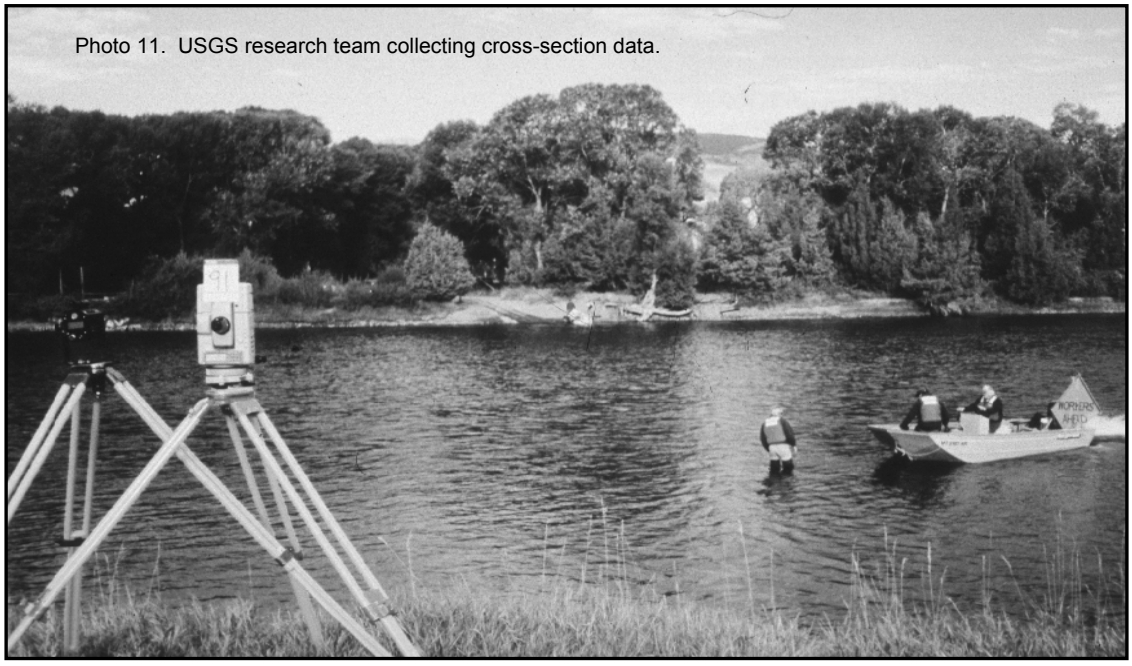


Photo 11. USGS research team collecting cross-section data.

Progress: Progress and significant results for Fiscal Year 2001 included completion of river cross-section surveys, resurvey of selected cross sections, sampling of bed load and suspended sediment, and the survey/resurvey of selected flood bars. Laboratory analysis of bed load and suspended sediment was completed. Additional funding was provided to survey 20 additional cross sections, and this work was completed. Development of both the sediment transport and floodplain models was initiated.

Future Work: Plans for 2002 include finalizing sediment transport and floodplain models, other analyses, and the writing of the interpretive reports. A small amount of fieldwork may be required to verify certain aspects of the floodplain mapping effort.

Projected Completion Date: December 2002 for completion of analysis and draft reports. Final reports will go through an internal USGS review and are projected to be released by the end of Fiscal Year 2003.

Products: Two USGS Water-Resources Investigations Reports will be published. The first report will describe the sediment-transport modeling for the stream reach from Carters Bridge to Pine Creek Bridge. The second report will be a map report showing the delineated flood plain.

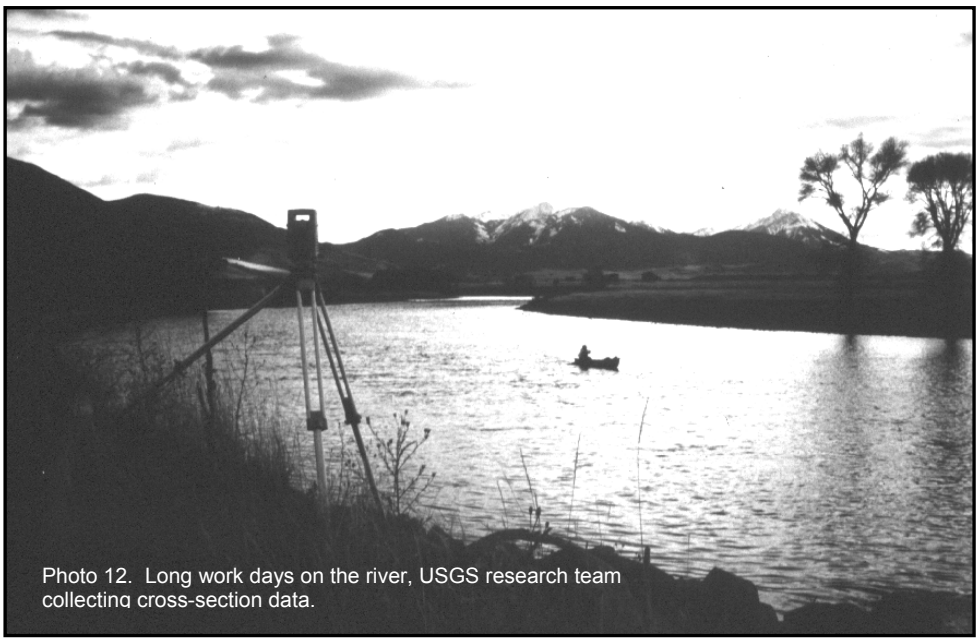


Photo 12. Long work days on the river, USGS research team collecting cross-section data.

4. RIPARIAN TREND ANALYSIS

Title: Temporal Patterns of Channel Migration, Fluvial Events, and Associated Vegetation Along the Yellowstone River, Montana

Principal Investigator: Dr. Michael Merigliano (Riparian Ecologist)
University of Montana, School of Forestry, Missoula Montana

Other Participants: Mary Louise Polzin, John Corkery, Rachel Powers
University of Montana, School of Forestry, Missoula Montana

Goal: Determine relationship between fluvial geomorphic processes and floodplain vegetation.

Objectives:

1. Determine floodplain turnover rate and stratify by geomorphic setting. Incorporate Hydrogeomorphic Model (HGM) data and methods where appropriate.
2. Relate the magnitude and frequency of flow events to floodplain erosion and deposition (turnover) and associated cottonwood patches.
3. Incorporate the influence of ice drives on vegetation and floodplain dynamics.
4. Characterize the age distribution of the forest along the study area and cottonwood patches that comprise the forest.
5. Assess cottonwood longevity and limitations (that is, clearing, natural mortality, and floodplain erosion).
6. Create maps of channel migration history and existing floodplain vegetation.
7. Use information on historic changes, and hydraulic and geomorphic factors to evaluate cumulative effects of bank stabilization projects.

Methodology: Floodplain aging relies on cottonwood tree ages and sequential aerial photography. Cottonwood is one of the first plants to colonize new gravel bars and is also long lived. Some sampled tree ages exceed 200 years. The age distribution of the cottonwood forest on an aerial basis (rather than the usual stem numbers) is the main signal indicating floodplain erosion and deposition dynamics. Stand age and structure are related, and in turn, wildlife habitat and stand structure are also related. As stands age, trees not only get larger, their branch architecture changes, stems become more conducive to cavity nesters, and there are typically site changes that allow other plants to become established. Structure is related to wildlife habitat.

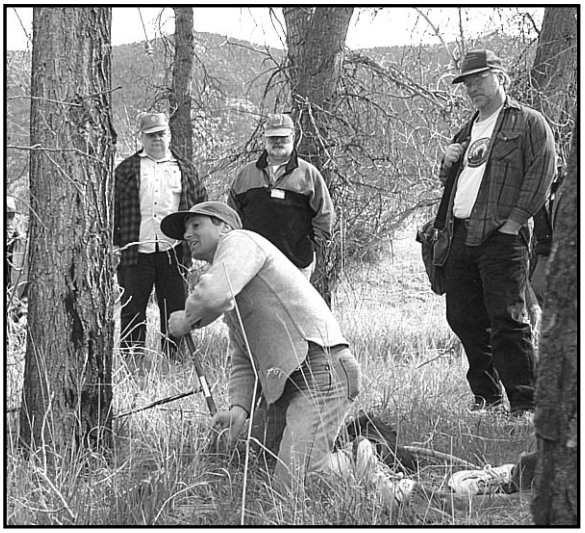


Photo 13. Dr. Merigliano demonstrating tree coring technique to educational workshop participants.

Progress: Tree aging was the dominant task for fieldwork, which began in June and extended into late August 2001. In 2000, 565 trees were aged, while 477 were aged in 2001. All of the cores are mounted and prepared for counting, and about three-quarters of them have been counted. Cottonwood tree ages serve as a clock for the age of the flood plain. In 2000, we concentrated on the braided reaches above Livingston, where we completed eight sample sections. Each section is about 184 acres and includes the flood plain and wetted channel. In 2001, we concentrated on the more confined yet braided reaches above and below Livingston, and began sampling to assess the prevalence of vegetative reproduction (for example, root suckers) in the forest. Each of these sections was about 74 acres, and we completed eight of them.

Describing the riparian vegetation for wildlife habitat purposes was another activity undertaken in the summer of 2001. About 80 percent of the sample areas aged (see above) was mapped and described. The upper, terrace confined reach from Point of Rocks to Mallards Rest was observed for possible mapping. This area is relatively simple and a map is probably not necessary.

We obtained about 30 historic photographs dating from 1971 to the mid-1930s. Most of these have been retaken (see *Photos 15* and *16*). As in 2000, smoky conditions and logistics prevented retaking all of them. All but two of the photo points (where the photographer stood) and scenes have been located and we have received landowner permission for all known points.

There is little evidence of ice drives as an important geomorphic agent.

Future Work: Ring counting and mapping occupies us during the winter months. Summer 2002 will see continued tree aging in the very confined reaches and within the braided reaches already sampled for floodplain age. The main objective of this aging is to assess the age structure within stands, and not so much the floodplain age. In some locales, vegetative reproduction of cottonwood is important. We plan to quantify the extent and obtain preliminary results on what factors determine why some stems of vegetative reproduction reach maturity. Vegetative mapping will also continue in the confined-braided reaches, which are nearly completed. Vegetation types within the very confined reaches (for example, Gardiner to Yankee Jim, and Eightmile Creek to Mallards Rest) will be quantified by types, rather than mapped, as the stands are very small. Time permitting, we will also survey some floodplain cross sections to assess sedimentation rates on the flood plain and tree establishment surfaces.

Projected Completion Date: December 2002.

Products:

1. Maps showing existing vegetation and cottonwood patch age classes.

2. Age distribution of cottonwood forest.

3. Floodplain turnover rates (based on a decay curve of floodplain age by area derived from #2 for lower reaches below Emigrant). The upper reaches may not have an extensive true flood plain and the turnover concept will be modified accordingly.

Photo 14. Photo illustrating cottonwood ages and historic river channel migration; note the tree ages circled and the bands of tree establishment as the channel migrated over time.

4. The relation between flow events and cottonwood establishment, and the influence of ice drives.

5. Data (field maps and notes) on existing vegetation community types, and wildlife habitat variables (to be determined).

6. Assessment of cumulative effects of bank stabilization projects incorporating the results of hydraulic modeling and floodplain dynamics. The frame of reference will be the channel migration rate and associated cottonwood forest age distribution under conditions as close to natural as possible.

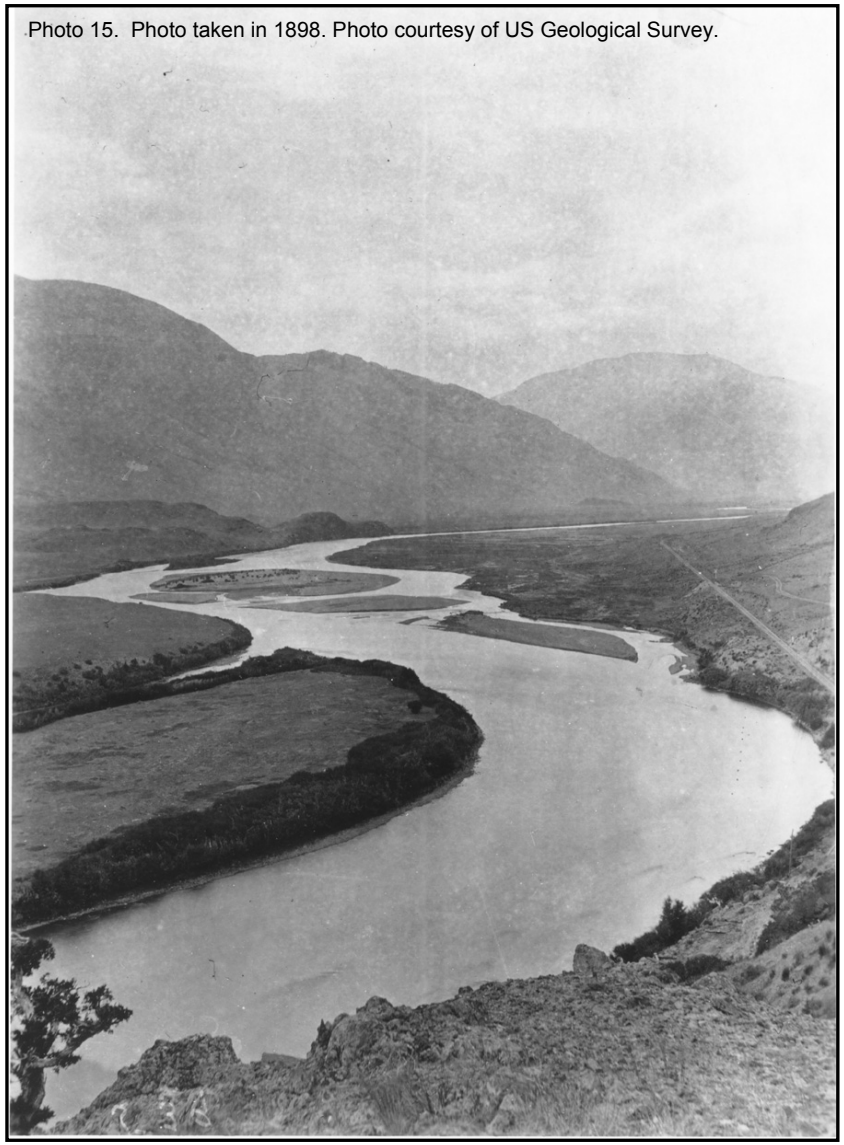


Photo 15. Photo taken in 1898. Photo courtesy of US Geological Survey.

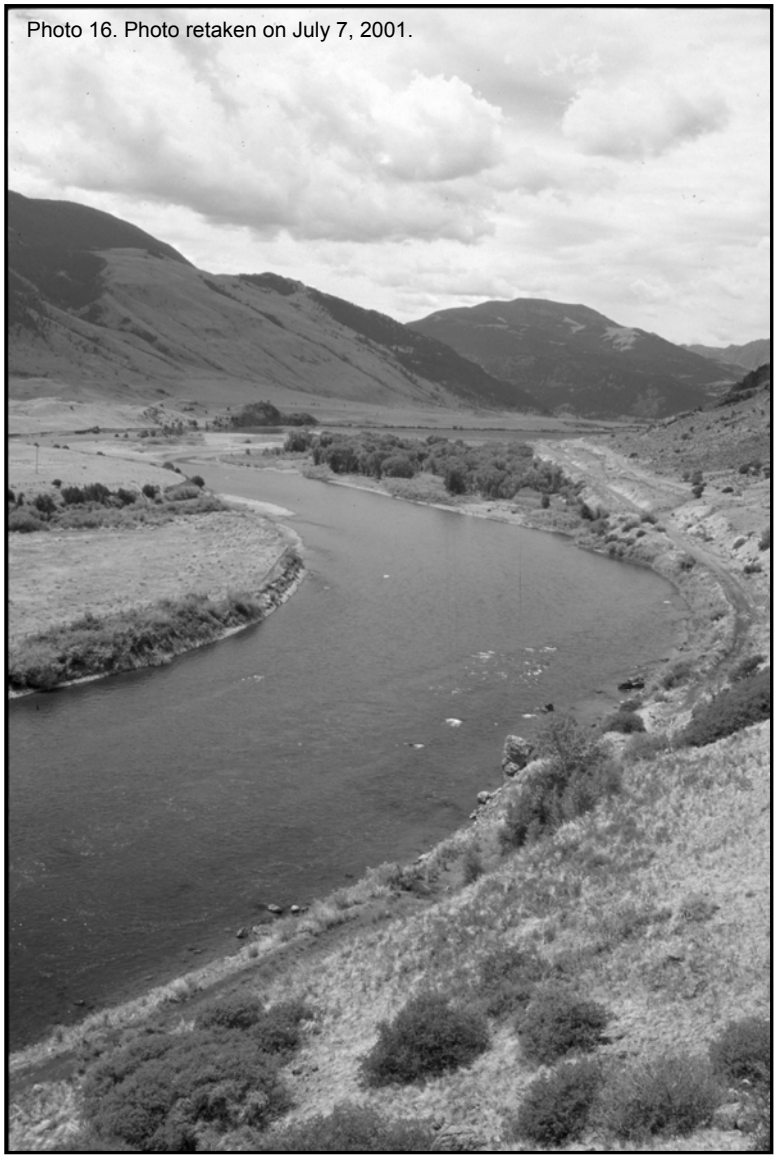


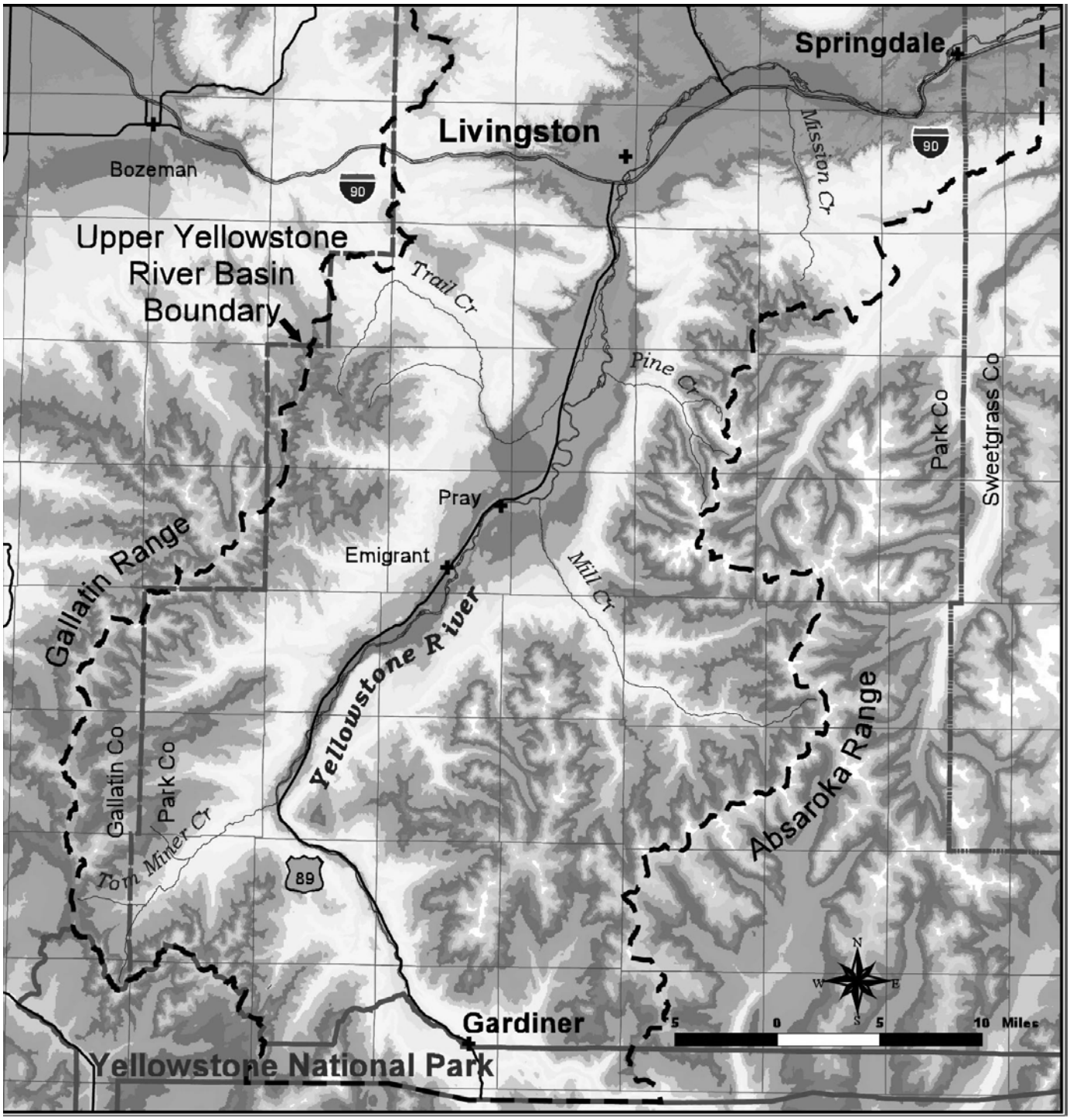
Photo 16. Photo retaken on July 7, 2001.

Photos 15 and 16. Walcott, C.D. #539. Original photo taken in 1898. Retaken on July 7, 2001
The Yellowstone River and environs from Point of Rocks. View is upstream toward Dome Mountain. The railroad track and Yellowstone Trail are clearly visible at right-center. Road construction since 1898 changed the immediate foreground and prevented a retake from Walcott's exact standpoint. The most marked changes are an increase in cottonwood and willow near center view and re-arrangement of islands via erosion and deposition. The shrub-fringed features at left are old terraces and were likely naturally devoid of trees on their top surfaces. The shrub-fringe is dominated by willow (*Salix bebbiana, S. exigua*), silver buffaloberry (*Sheperdia argentea*), and Rocky Mountain juniper.

See color *Project Study Site Map*.

See color *Project Study Site Map*.

Map 2. Upper Yellowstone River Study Area



5. FISHERIES ANALYSIS

5A. Fish Populations Study

Title: Comparative Use of Modified and Natural Habitats of the Upper Yellowstone River by Juvenile Salmonids

Principal Investigators: Dr. Alexander V. Zale (Assistant Unit Leader)
Montana Cooperative Fisheries Research Unit, US Geological Survey
Montana State University, Department of Biology, Bozeman Montana

Thomas E. McMahon (Professor of Fisheries Management)
Montana State University, Department of Biology, Bozeman Montana

Other Participants: Douglas L. Rider (Graduate Research Assistant)
Montana Cooperative Fisheries Research Unit, US Geological Survey
Montana State University, Department of Biology, Bozeman Montana

Montana Department of Fish, Wildlife and Parks

Goal: Estimate to what extent bank stabilization, flow deflection, and flow confinement structures have changed aquatic habitat use by juvenile salmonids in the Yellowstone River.

Objectives:

1. Conduct a literature review and associated consultations of experts to summarize pertinent research and to guide the development of a sampling program using appropriate capture methodologies to assess fish abundances in habitats of the Yellowstone River at appropriate times of the year.
2. Compare seasonal use of altered and analogous unaltered main-channel margins (bank habitats) by juvenile salmonids.
3. Assess juvenile fish use of lateral side channels to determine the effects of disconnecting them from the main channel.

Photo 17. Fish Populations study team electrofishing.

Methodology: Our primary approach is to sample juvenile salmonids along shoreline transects using electrofishing gear. Transects are 50 meters long and were selected randomly after stratification by bank type. Bank types evaluated are riprap, barbs, and jetties, and unaltered outside bends, inside bends, and straight shorelines. Fish abundances are expressed as numbers per meter of shoreline captured during a single electrofishing pass and are compared among bank types using analysis of variance. Sampling is conducted prior to spring runoff (April 1 to May 15), during summer low flow (July 1 to August 31), and late autumn (October 1 to November 15). Two river reaches are sampled. The Upper Reach extends from a bit downstream from Mallards Rest to just upstream from the confluence of Nelson's Spring Creek. The Lower Reach begins at Carters Bridge and ends at Mayors Landing. The Upper Reach includes eight sites of each bank type (48 total sites) and the Lower Reach includes six sites of each type (36 total). Our primary emphasis is on the Upper Reach and we sample all of the sites there before moving to the Lower Reach. The onset of runoff and cold weather may limit how many sites are sampled in the Lower Reach in spring and autumn, respectively.

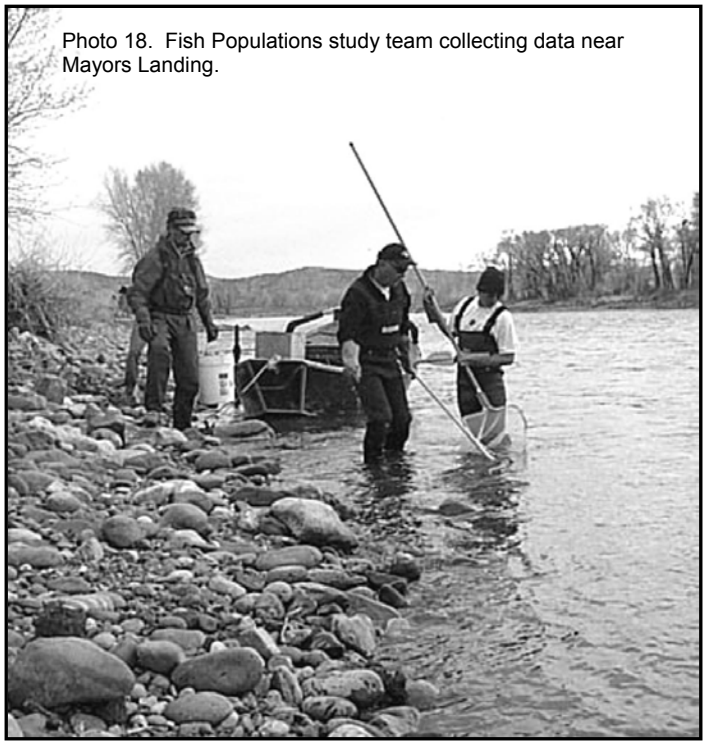


Photo 18. Fish Populations study team collecting data near Mayors Landing.

To determine if and to what extent juvenile salmonids use side channels, we conduct three-pass depletion electrofishing abundance estimates in ephemeral side channels during spring runoff. These abundance estimates allow inference of how many fish are displaced when a side channel is lost.

Progress: The literature review was completed in summer 2000. After a year of testing sampling methods, preliminary sampling, and study design development, we began sampling in earnest in April 2001 during the pre-runoff period.

All 48 sample sites in the Upper Reach were sampled during the pre-runoff, summer, and autumn seasons in 2001. The 36 sample sites in the Lower Reach were sampled during pre-runoff and summer, but only 12 of the sites (two of each bank type) could be sampled before the onset of cold weather in November 2001. Twelve 30-meter side-channel bank transects were sampled in early June 2001 during spring runoff, eight in the Upper Reach, and four in the Lower Reach. We had planned on sampling 15 such transects in 2001, but the brevity of runoff prevented us from reaching our goal. The 2001 data are currently being organization and analyzed.

Future Work: Fieldwork conducted in 2001 will be repeated in 2002 to examine annual variability in fish use of the various habitat types. More normal river discharges in 2002 would enhance applicability of our data and allow a more comprehensive assessment of side-channel use during runoff.

Projected Completion Date: December 2002.

Products: A final report in standard scientific format describing the findings and relevance of the study will be produced. It will include an abstract (executive summary), introduction, and methods, results, and discussion sections. In addition, a presentation of findings will be made to the Task Force after completion of the study.

5B. Fish Habitat Study

Title: Effects of Channel Modification on Fish Habitat in the Upper Yellowstone River

Principal Investigator: Lee Ischinger (Section Leader, Stream and Riparian Ecology)
US Geological Survey—Biological Resource Division, Fort Collins Colorado

Other Participants: Zack Bowen (Fisheries Biologist)
Ken Bovee (Hydrologist)
Jim Terrell (Fish and Wildlife Biologist)
Terry Waddle (Hydrologist)
US Geological Survey, Fort Collins Colorado

Goal: Determine whether certain types of channel modification are potentially more detrimental to fish populations than others.

Objectives:
1. Quantify the relative severity of impacts of different types of channel modifications.
2. Identify potential linkages between critical habitat types and fish populations. Such knowledge may help guide regulatory agencies and riparian landowners toward management practices that meet the dual objectives of protecting property and minimizing impacts to fisheries.
3. Provide baseline data for evaluating future changes in the river corridor.

Null Hypotheses[3]:

(1) There is no difference in the area of shallow, low-velocity habitat over time between altered and unaltered reaches throughout the area defined by the floodplain model.

(2) There are no significant differences in the temporal distribution of habitat classes between altered and unaltered channels in the upper Yellowstone River.

(3) There are no significant differences in relative abundance of young salmonids in altered and unaltered channels in the upper Yellowstone River.

(4) The availability of key habitats in the upper Yellowstone River is unrelated to the relative abundance of young salmonids.

Measures:

Duration statistics for area of shallow, low-velocity habitat for 1980 to 2000.
Various habitat metrics for each sub-reach as a function of discharge, including some or all of the following:

- Class area
- Mean patch size
- Patch density
- Patch richness
- Edge density
- Mean nearest neighbor index
- Mean shape index
- Habitat diversity
- Interspersion/juxtaposition

Temporal distribution (habitat duration statistics) of selected habitat metrics, by season, for a wet water year (1997), a near-normal water year (1998), and a dry year (2001). Duration statistics will be based on mean daily discharges at the Livingston gage for each water year.

Seasonal relative abundance of sub-yearling rainbow, brown, and cutthroat trout and mountain whitefish in altered and unaltered sub-reaches of the upper Yellowstone River.

[3] Null Hypothesis = a statistical hypothesis (theory) to be tested and accepted or rejected in favor of an alternative; specifically: the hypothesis that an observed difference (between the means of two samples) is due to chance alone and not due to a systematic cause.

Indicators:

Availability of shallow, low-velocity habitats.

Key habitat classes associated with relative abundance of juvenile salmonids.

Deviation from control sections versus treatment sections, in seasonal availability of key habitat classes during high, normal, and low water years.

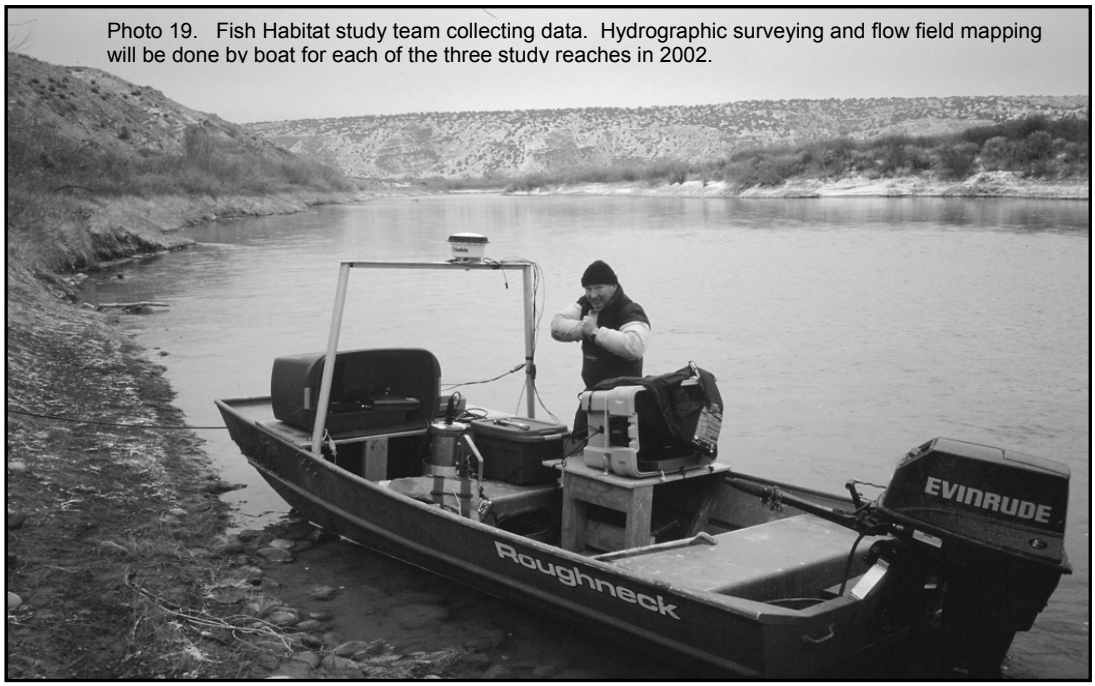


Photo 19. Fish Habitat study team collecting data. Hydrographic surveying and flow field mapping will be done by boat for each of the three study reaches in 2002.

Study Overview:

Phase 1 will be a map-based evaluation of area of shallow water habitat important to juvenile salmonids focusing on bankfull and overbank flows. We will develop a habitat versus flow relation using bankfull and overbank flows, and provide water surface area for flows near base flow and median flow. We will use data and estimated water surface elevations from the USGS Water Resources Division (WRD) floodplain delineation study in conjunction with the digital elevation model produced through the geomorphology and topographic mapping efforts to develop a relation between flow and shallow water habitat throughout the area defined by the 100-year flood line from the WRD water surface elevation model.

Phase 2 will entail intensive data collection, hydraulic modeling, and habitat mapping in three reaches totaling 15.3 km:

Reach 1. River miles 513.4 to 510.8 (a bit downstream from Mallards Rest to just upstream from the Pine Creek Bridge; 2.6 miles).

Reach 2. River miles 509.2 to 506.6 (some distance downstream from Pine Creek Bridge to just upstream from the confluence of Nelson's Spring Creek; 2.6 miles).

Reach 3. River miles 500.8 to 496.5 (from just above Siebeck/Nineth Street Island to channel split below sewage treatment facility; 4.3 miles).

These reaches were selected to coincide with areas sampled as part of the Fish Populations Study and to represent different channel configurations.

Two-dimensional (2-D) habitat maps will be developed for each study reach for the same range of flows

examined in the Fish Populations Study. Habitat map development will entail bathymetric data collection, 2-D hydraulic modeling, and geospatial mapping. Physical data requirements of the hydraulic model include a three-dimensional bathymetric map of each study site, a bed material map, and certain flow-related boundary conditions. We will employ global positioning system (GPS) and standard surveying techniques to establish elevation control and standard stream gaging techniques to determine discharge. We will obtain planform locations using GPS, depths by hydroacoustic sounding, and bed material types by post processing and analysis of hydroacoustic signals. For areas above the water surface we will incorporate the 1:6000 scale-digitized photogrammetry data being developed by the Corps in cooperation with the DNRC and USGS (Montana District). By combining overbank topography and in-channel bathymetry in a single bed file, accurate quantification of off-channel habitat (such as, overflow channels on flood plains and tributary mouths) is made possible. This is particularly important when quantifying fish habitat availability under flood conditions. These simulations may also be useful to other study components and will be made available to other investigators in this project.

Photo 20. Fish Habitat study team setting up survey data-collection equipment.

A geographic information system (GIS) will be used to assemble the different data layers and transform field bathymetric data into a finite element mesh for flow simulation. We will use a finite element, depth averaged 2-D hydrodynamic model to simulate depths and velocities over a range of discharges at each site.

As part of the Fish Populations Study, Montana Cooperative Fisheries Research Unit (MTCFRU) is sampling fish populations seasonally at numerous sites. Included in the fish population data will be such information as relative abundance and age structure of trout, mountain whitefish, dace, and suckers. This information will be key to the determination of critical habitat types. Relative abundance data alone may help delineate critical habitat types. The seasonal sampling regime may be used to account for fish movement from site to site. If fish movement can be related to the appearance or disappearance of certain habitat types, supporting evidence may be provided regarding the importance of those habitats.

Habitat maps for each of the MTCFRU sampling locations will be constructed for 8 to 12 discharges, encompassing the same range of discharges examined under the Fish Populations Study. Maps for the same discharges that were present during fish sampling will be included. Generalized habitat suitability criteria developed through the MTCFRU literature review will be used to define habitat classes based on depth, velocity, substrate, and cover. We will coordinate with MTCFRU to select the appropriate metrics for this analysis.

Relationships between relative abundance of the target species or other biological metrics and site-specific habitat characteristics will be analyzed cooperatively with MTCRFU. Our goal will be to identify key habitat features that are associated with various population attributes. We will employ habitat time series analysis in this step, but we will confine the analysis to the most recent five-year period. We assume that the events shaping the age structure and relative abundance of fishes will have occurred during this most recent time period. Once these key habitat features have been identified, they will be used to describe the relative impacts of different channel modification activities. These relative impacts

will also be analyzed by habitat time series. However, under the Fish Habitat Study, we propose to sample year-types from the period of record rather than using the entire record. This will result in a comparison of habitat characteristics between control and treatment under the hydrologic conditions of a dry year, a normal water supply, or a wet year, for example.

Progress: A network of three survey control points including permanent benchmarks for each study reach was established during September 2001. A survey of the locations and topography of various control structures in each study reach was also completed during September while the river was at base flow and structures were accessible. A photo log was taken to document the general size class of material used in different structures.

Future Work: Hydrographic surveying and flow field mapping (by boat) for each of the three study reaches will be conducted during the early recession of runoff during the summer of 2002 (probably June). Data reduction, analysis, and map production will be completed by fall 2002. Findings from the habitat mapping and modeling project will then be integrated with results from the Fish Populations Study.

Projected Completion Date: December 2002.

Products: Phase 1 will result in an estimate of the area of shallow, low-velocity habitat over time throughout the study area. Phase 2 will produce a GIS database, habitat maps, and photos which will be analyzed in conjunction with data from the Fish Populations Study to describe the relations among fish abundances, physical habitat characteristics, and channel modifications in the three study reaches.

6. WILDLIFE (BIRD) ANALYSIS

Title: Riparian Habitat Dynamics and Wildlife along the Upper Yellowstone River

Principal Investigators: Dr. Andrew Hansen (Associate Professor of Ecology)
Dr. Jay Rotella (Ecology Department Head, Associate Professor)
Noah Greenwald (Ph.D. Student)
Montana State University, Bozeman Montana

Objectives:

1. Estimate the current spatial distribution and abundance of individual bird species and community diversity in riparian forest habitats along the upper Yellowstone River.
2. Determine the accuracy of the estimates of bird abundance and diversity.
3. Quantify the relative influence of channel characteristics (geomorphology and hydrology) and riparian vegetation (structure, composition, and spatial pattern), on bird species abundances and community diversity.
4. Estimate change in bird abundances and community diversity from 1950 to 2000 based on channel characteristics and riparian vegetation.
5. Estimate the relative importance of current riparian forests for wildlife in the context of the Upper Yellowstone River Watershed.

Goal: This study will determine relationships between riparian habitat dynamics and riparian avifauna, often used as indicators of habitat integrity for wildlife.

Photo 21. Wildlife (bird) study team conducting vegetation measurements.

The study will take advantage of the extensive research that the Investigators have conducted on birds and vegetation in the neighboring Gallatin, Madison, and Henry's Fork Watersheds. Over the past six years, field surveys of birds, shrubs, and trees have been done at more than 100 sites across a range of cover types and elevations. Statistical models were then used to map the abundance of species over these watersheds based on cover type, parent material, and elevation. In the proposed study, the statistical models for birds will be applied to the Yellowstone watershed and then field surveys will be used to quantify the accuracy of the predictions.

The study will focus on birds because:

1. Resources will not allow adequate sampling of all vertebrate species,
2. Birds can be sampled more cost effectively than other vertebrate species, and
3. The large number of bird species that can be sampled (more than100 species) allows this group to be good indicators of how habitat changes are likely to influence other vertebrate groups.

Methods:

Objectives 1 and 2. Current bird distribution and validation

Statistical models developed for riparian forest bird species in the Gallatin, Madison, and Henry's Fork watersheds will be use to predict bird species abundances (for more than 50 species) in the Upper Yellowstone River Study Area. Point counts of bird abundance will be conducted in the study area during each of two breeding seasons. The results of the field surveys will be used to validate and, if necessary, improve, the habitat functions.

Objective 3. Influence of channel, vegetation, and land use on birds

The extent to which bird species abundances vary with channel and vegetation characteristics will be determined by statistical analysis. Data on the current distribution of the predictor variables will be obtained from the other studies of hydrology and riparian vegetation being conducted in the study area.

Multiple regression and mixed models will be used to evaluate the relationships between birds and the predictor variables. Mixed models evaluate the relationship between a response variable and fixed and random predictor variables. Fixed variables are those that meet the assumptions of independence. Random variables are not assumed to be independent; hence the method is attractive when samples are spatially or temporally correlated. We have found in previous analyses of biodiversity that samples close in space or measured repeatedly over time are correlated. Hence we will control for this correlation by considering spatial location and time periods as random variables.

Models based on channel, vegetation, and land use variables will be evaluated and "best" models selected based on Akaike's Information Criterion and parsimony. The results will reveal the relative strength of each of these classes of predictor variables in explaining variation in bird species. We will also use the results to better extrapolate bird species abundances over riparian forests in the study area based on channel and vegetation characteristics.

Objective 4. Bird change: 1950 to 2000

The habitat functions generated above will also be used to predict change in bird abundance between 1950 and 2000, based on change in the predictor variables quantified using aerial photographs. The results will reveal the trajectories in species abundances over time and will provide important information for future floodplain, riparian, and channel management decisions.

Objective 5. Watershed context

An important criterion for evaluating bank stabilization and other channel characteristics is the importance of riparian vegetation along the river in the context of the entire Yellowstone watershed. We will use the habitat functions developed in previous studies and in this study to map bird distributions over the upper Yellowstone watershed from riparian habitats up in elevation to subalpine habitats. We will analyze these maps to determine what percentage of each bird species population is present in riparian forest along the Yellowstone River.

Progress: During the 2001 field season, 130 avian survey points were established in seven riparian habitat types across the study area and three morning surveys were completed at each point. Vegetation measurements were completed at 63 of the points. Most data from the field season has been entered and awaits analysis.

Future Work: Preliminary data analysis will begin during the winter 2001to 2002. Survey of the 130 points and vegetation measurements at the remaining 67 points will be completed during the 2002 field season. Completion of final data analysis and reporting of results will occur over the winter 2002/2003.

Projected Completion Date: April 2002.

Products:

1. Models of avian distribution and abundance based on channel features and vegetation characteristics.

2. Maps of riparian habitat and avian species distribution and abundance for 1950 and 2000.

3. A final report that details changes in avian abundance and distribution between 1950 and 2000, identifies habitat features that support high species diversity, and documents the importance of current riparian habitats for wildlife.

Photo 23. Bird study team conducting vegetation measurements.

Photo 24. Noah Greenwald conducting avian survey.

7. SOCIO-ECONOMIC ASSESSMENT

Title: Upper Yellowstone River Socio-Economic Assessment (Phase I)

Principal Investigators: Browne, Bortz, & Coddington
BBC Research and Consulting
Denver Colorado
Edward Harvey (Project Leader)
Doug Jeavons (Project Management)
Sara Flitner and Liz Bremmer (Facilitators)
Lloyd Levy (Social Values Lead)
Marc Carey (Economic Lead)
Andy Fritsch (Data Collection/Analysis)

Goal: Characterize the human environment within the Upper Yellowstone River Study Area.

Objectives:

1. Develop an economic portrait of the study area.
2. Provide a baseline social assessment of the study area.
3. Identify trends in land use, economic and social values and conditions.
4. Project the impacts 20 to 25 years into the future, assuming the "no action" alternative is selected.

Methods: Extensive interviews, secondary data, and economic analysis.

Progress: After almost a year of negotiations, a contract was signed with BBC in late September 2001.

Future Work: Two public meetings, interviews with local officials and stakeholders, economic data gathering. Demographic forecasting.

Projected Completion Date: October 1, 2002.

Products: Final report to provide historical background, interview results with stakeholder groups, and identification of key socio-economic issues.

Socio-Economic Assessment Overview:
The Socio-Economic Assessment will be conducted in Park County, Montana and the upper Yellowstone River study area. This assessment will inform decision makers about economic, social, and cultural conditions and trends, and provide information useful in defining important policy, regulatory, and management recommendations.

The overall Socio-Economic Assessment will be approached in two phases. Phase I will be a collaborative effort between the Task Force and Corps. Phase I is a baseline characterization study consistent to the level of detail with other technical studies. The two phases provide distinctly different products and have different focuses. They are, however, linked and Phase II will build upon information gathered in Phase I. Phase II will be conducted exclusively by the Corps, if needed. The decision whether or not to pursue Phase II will be based on the results from Phase I.

Socio-economic data will be presented in a comparative format (matrix) that is easy to follow. To the extent possible, the data collected will be cross-tabulated and presented in a decision matrix. Phase I analysis will include separate discussions of (1) land use, (2) how land use has impacted or has been impacted by growth in the area, (3) how land use has been impacted by bank stabilization projects, and (4) how changing land use has or is impacting the Yellowstone River system.

An expectation for Phase I is that important cause-effect relationships will be identified. The data collected in Phase I will be presented and packaged in a format that allows for a logical progression into the potential, Corps-led Phase II.

Phase I: Socio-Economic Foundation

Step 1 Description of Socio-Economic Environmental Setting:
The first step is to assemble pertinent data and information that will enable a description of the environmental setting to be articulated in terms of various selected economic factors. The final selection of these factors is expected to be a collaborative effort with the Corps, various federal, state, and local agencies and the Task Force. A description of the socio-economic environmental setting should take into consideration such factors as population characteristics, community and institutional structures, political and social resources, individual and family changes, community resources, natural ecosystem impacts on the socio-economic setting, land use, and emerging trends. One of the first elements of this task will include the completion of an inventory of the existing baseline conditions.

Step 2 Identification of Vital Socio-Economic Factors:
The purpose of this step is to identify socio-economic factors that represent vital elements relative to the human environment within the study area and river corridor. This will involve public meetings, surveys, and other activities that will (a) assess stakeholder issues, (b) solicit public input, and (c) analyze the data collected.

Photo 25. December 13th Task Force meeting: Ed Harvey (Socio-Economic study team leader) asking Task Force members to share information with the group.

Phase I Work Plan

Task 1. Identify Historical and Social Values, Cultural Heritage and Resources
The purpose of Task 1 is to identify recent and long-term historical trends in social values and cultural heritage and resources.

Task 2. Identify Stakeholder Groups and their Respective Interests
This task is intended to identify the present key stakeholder groups and the special interests that they represent in the study area. This task is fundamental to describing the socio-economic foundation, and in particular the identification of vital socio-economic factors.

Task 3. Identify Current Social Values

The purpose of Task 3 is an assessment of current social values of stakeholders for the management of the study area. This task follows from Task 2 and is the next logical step in describing the identification of vital socio-economic factors. This task, and Task 4, will entail extensive surveys of respective stakeholder groups.

Task 4. Identify the Current Cultural Values

Task 4 will be an assessment of current cultural values and resources of stakeholders in the study area. This task is coincident to Task 3 and further contributes to identifying socio-economic factors.

Task 5a. Description of Local Economic Trends

In this task, the study team will describe and assess:

Economic and demographic trends,
Changes in the provision of public services and facilities, and
Displacement of farms.

Task 5b. Description of Land Use Trends

This task will provide a baseline picture of past trends during the 1970s, 1980s, and 1990s with a focus on changes in the past five years. This task will culminate in a picture of current land use, land-use plans, ordinances, regulations and restrictions, along with current land-use patterns in the Upper Yellowstone River Basin.

Task 6. Historic and Current Management Actions (Including Bank Stabilization Projects, Water Rights, and Irrigation Uses)

Historic and current management collectively describes the ways in which the native flows, water course, or other characteristics of the river system have been modified to serve human purposes in the study area.

Task 7a. Social Assessment: Population-Displacement of People

Secondary by-products of growth and change will be considered in Task 7. These attributes are elements of the perceived environment and with it the quality of life experienced by residents of Park County, users of the River, and others who encounter and appreciate the watershed.

Task 7b. Social Assessment: Future No-Action Condition

The historical and existing 404 permitting process will be described here. The study team will also develop projections for the future no action conditions

Task 8. Preliminary Study Issue Identification

Based on the study team's Phase I research and evaluations, a listing and categorization of the preliminary study issues will be prepared. The study team will categorize issues according to whether or not they might be affected by river management strategies and, separately, which of the Task Force or Corps studies will provide data upon which those issues might be evaluated.

Task 9. Public Participation

The purpose of this task is to create a liaison between the study team and the public. This will include design of a public participation program. Two public meetings are contemplated for Phase I.

Financial Statement

The Governor's executive order directs the Task Force "... to seek or encourage others to seek grants, funds or other cooperative arrangements to implement recommendations of the Task Force… ." Throughout our tenure (1997 to 2001), the Task Force has done just that, actively pursuing funding for the upper Yellowstone River research effort, educating the public, and supporting Task Force administration and operation.

Table 3 summarizes our project budget status, as of December 31, 2001. The table shows all costs associated with the Cumulative Effects Investigation project, from initiation to the development of management recommendations.

The Task Force benefits greatly from strong partnerships with a wide array of organizations and agencies. Many community members; local, state, and federal governmental agencies; and academics have generously donated technical support and assistance in each and every phase of project development and implementation. The $955,635 in-kind and match total shown in *Table 4* (more than 40 percent of our entire project budget) illustrates how monumental these contributions have been and will continue to be for the Task Force. Further, these tables include only documented contributions; many local citizens and technical experts have donated hundreds of hours to the project informally, without documentation. The Task Force can do little more than to give them our sincere thanks and recognize their efforts in this report.

Finally, *Tables 5* and *6*, address pending and secured sources of funding, respectively.

Table 3. Governor's Upper Yellowstone River Task Force Budget Summary
This table summarizes costs associated with Task Force activities from inception (November 1997) to management recommendation development (August 2003). Pending funding sources are outlined in *Table 5*.

Component / Task	Costs and Appropriated Funding (1997 - 2003; in dollars)			
	Grant Funding	Match or In-Kind Contribution	Other Funding Sources	Total
1. Park Conservation District Administration				
Park Conservation District Administration (10% fee)	24,000 (RDGP) 2,944 (319 #1) 4,268 (319 #2) 4,000 (319 #3) 3,108 (Start Up) 1,000 (BLM) 483 (223) 1,000 (WPA) 100 (Ed Grant)	0	0	
Subtotal	**40,903**	**0**	**0**	**40,903**
2. Task Force Project Administration, Coordination, & Management				
Task Force Administration / Operations				
Task Force Coordinator (all duties) **Outreach and Education** Public meetings, tours, workshops. **Data Dissemination/Report Publication** Web site, technical writing/editing, printing, mailings. **Management Recommendation Development**	22,500 (RDGP) 37,056 (319 #1) 53,732 (319 #2) 40,000 (319 #3) 900 (Ed Grant) 28,297 (Start Up)	42,999 (TF) 16,000 (State) 33,333 (DNRC)	0	
Subtotal	**182,485**	**92,332**	**0**	**274,817**

Table 3 continued

Component / Task	Costs and Appropriated Funding (1997 - 2003; in dollars)			
	Grant Funding	Match or In-Kind Contribution	Other Funding Sources	Total
3. Baseline Data Acquisition and Analysis				
Physical Features Inventory	2,100 (WPA)	1,200 (PCD) 8,000 (NRCS)	25,700 (Corps) 7,015 (TF/State) 7,000 (NRCS)	51,015
Aerial Photography	10,000 (HB223)	11,233 (Start Up)	4,500 (State)	25,733
Geomorphic Analysis	49,700 (RDGP)	172,670 (DNRC)	0	222,370
Hydrology/Hydraulic Analysis	108,250 (RDGP)	168,250 (USGS)	60,000 (MDT) 6,500 (Start Up) 6,500 (Corps)	349,500
Topographic/Contour Mapping	0	0	180,000 (Corps)	180,000
NWI Riparian/Wetlands/Land Use Mapping	0	19,500 (USFWS)	29,422 (Corps)	48,922
Riparian Trend Analysis	94,993 (RDGP) 6,017 (HB223)	0	54,900 (Corps)	155,910
Fisheries Analysis				
Fish Populations Study	0	0	97,536 (Corps)	97,536
Fish Habitat Study	0	205,000 (USGS)	200,000 (Corps)	405,000
Watershed Land Use Assessment	9,000 (WPA)	40,000 (NRCS) 7,950 (GIAC)	0	56,950
Wildlife (Bird) Assessment	0	0	106,000 (Corps) 9,000 (BLM)	115,000
Socio-Economic Assessment, Phase I	0	0	145,312 (Corps)	145,312
Subtotal	**280,060**	**633,803**	**939,385**	**1,853,248**
4. General Project Support / Match	0	142,000 (RDGP/Corps) 85,000 (Corps Budget) 2,500 (FWP)	0	**229,500**
Total Project Costs	**$503,448**	**$955,635**	**$939,385**	**$2,398,468**

TF = Task Force
FWP = Montana Fish Wildlife and Parks
State = contributions from Montana DEQ, MDT, FWP.
RDGP = Reclamation and Development Grant Program
WPA = DNRC Watershed Planning and Assistance Grant
DNRC = Department of Natural Resources and Conservation
MDT = Montana Department of Transportation

USFWS = US Fish Wildlife Service
319 = DEQ Section 319 Water Quality Grant
HB223 = DNRC House Bill 223 Grant
NWI = National Wetland Inventory
Start Up = Task Force Start Up Grant (DEQ)
NRCS = Natural Resources Conservation Service
GIAC = Geographic Information Analysis Center

Corps = US Army Corps of Engineers
PCD = Park Conservation District
BLM = Bureau of Land Management
USGS = US Geological Survey

Table 4. Governor's Upper Yellowstone River Task Force In-Kind and Match Contributions
This table lists documented in-kind and match contributions made in support of the Upper Yellowstone River Cumulative Effects Investigation to date (December 31, 2001).

Contributor	Estimated Contribution (Dollars)	Study/Activity (1997 – 2001)
Corps	**227,000**	**General Project Support**
GIAC, MSU	**7,950**	**Watershed Land Use Assessment**
Montana DNRC	**33,333** **172,670**	**Coordination/Education/Administration** **Geomorphic Analysis**
Montana FWP	**2,500**	**Research Team / Technical Support**
Montana State Agencies **DEQ, MDT**	**16,000**	**Coordination/Education/Administration**
NRCS	**8,000** **40,000**	**Physical Features Inventory** **Watershed Land Use Assessment**
Park Conservation District	**1,200**	**Physical Features Inventory**
Task Force	**42,999** **11,233**	**Project Coordination and Administration** **Aerial Photos**
USFWS	**19,500**	**Riparian/Wetlands/Land Use Mapping**
USGS-BRD	**205,000**	**Fish Habitat Study**
USGS, Montana District	**168,250**	**Hydrology/Hydraulic Analysis**
Total In-Kind & Match Contribution	**$955,635**	

Table 5. Governor's Upper Yellowstone River Task Force Pending Sources of Funding
This table illustrates sources of funding that were applied for in 2001 and are still pending as of December 31, 2001.

Source	Activity/Study	2001 Total Funding Requested (Dollars)
Section 319 Water Quality Grant (#4) Montana DEQ	Task Force Coordinator and Coordination of Cumulative Effects Investigation	122,200
EPA Consolidated Funding Process Regional Geographic Initiative	Geomorphology Study	30,000
EPA Consolidated Funding Process Regional Geographic Initiative	Final Project Phase: Coordination, Outreach and Education	75,000

Table 6. Governor's Upper Yellowstone River Task Force Secured Funding Summary.
This table illustrates secured funding by source (grant and agency), and how much of that funding has been spent to date (December 13, 2001).

Source	Activity/Study 1998 - 2001	Date Completed	Total Funding Allocated (Dollars)	Funding Spent (Dollars)
Watershed Assistance Grant Montana DNRC	Coordination and Initial Assessment	6-30-99	2,100	2,100
HB 223 Conservation District Grant Montana DNRC	Aerial Photography	7-30-99	10,000	10,000
Riparian/Wetlands Education Grant Montana DNRC	Hydrologic Response to the 1988 Fires Workshop	6-30-00	1,000	1,000
Section 319 Water Quality Grant (#1) Montana DEQ	Task Force Coordinator	9-30-00	40,000	40,000
Task Force Start-Up Grant Montana DEQ	Aerial Photography Task Force Administration	6-30-01	49,138	49,138
Reclamation Development Grant Program (RDGP) 1999 Montana State Legislature Total: $299, 443	Geomorphic Analysis (DNRC) Hydraulic Analysis (USGS) Riparian Trend Analysis (U of M) Task Force Project Coordination Grant Administration (PCD)	NA	49,700 108,250 94,993 22,500 24,000	236,131
US Army Corps of Engineers Budget Allocation: Fiscal Year 1999 = 372,000 Fiscal Year 2001 = 650,000 $1,022,000	Physical Features Inventory Hydraulic Analysis Riparian/Wetlands/Land Use Mapping Fish Populations Study Fish Habitat Study Topographic Mapping Wildlife (Bird) Assessment Socio-Economic Assessment HGM Case Study Riparian Trend Analysis Project Coordination	NA	25,700 6,500 29,422 97,536 200,000 180,000 106,000 145,312 5,000 55,000 80,000	960,470 (Committed)
Section 319 Water Quality Grant (#2) Montana DEQ	Task Force Coordinator and Office	NA	58,000	41,860
Local Gov't Start-up Grant Program ESRI	GIS Software, Arc View program for Task Force Office	NA	5,000 (Estimated value)	NA
HB 223 Conservation District Grant Montana DNRC	Riparian Trend Analysis	9-28-01	6,500	6,500
Watershed Planning Assistance Grant Montana DNRC	Watershed Land Use Assessment	1-31-01	10,000	10,000
Section 319 Water Quality Grant (#3) Montana DEQ	Task Force Coordinator/Coordination of Cumulative Effects Investigation	NA	44,000	0

Collaboration and Partnerships

Partnerships and Contributions

The Task Force takes very seriously our charge to establish partnerships and to provide enhanced communication amongst the diverse groups who are concerned about the Yellowstone River. With each successive year, we build stronger relationships with groups directly involved with the upper Yellowstone effort, as well as reaching out to other groups interested in learning more about our cumulative effects investigation. Numerous other agencies and organizations are conducting research studies throughout the Yellowstone River Basin. The Task Force takes every opportunity to share technical information with these groups and will continue to do so in the future.

Task Force Subcommittees—Given the overwhelming amount of work that is being accomplished and the multitude of decisions brought before them, the Task Force has used specially appointed subcommittees to add extra energy to particularly difficult or time-consuming issues. The Socio-Economic and Workshop Subcommittees have provided significant assistance to the full Task Force in 2001. The Socio-Economic group met at least once a month for more than a year in order to move the socio-economic assessment proposal to contract. The Workshop Subcommittee provided tremendous insight and energy to the Task Force coordinator, thus helping to make both 2001 educational workshops very successful.

Task Force Partners—The Task Force structure illustrates how community-led, private/government collaborations provide an ideal approach to watershed management. Community members are empowered and given an opportunity to be a part of the management of their watershed. Regulatory agencies and academics work alongside local citizens, helping to guide the process in a scientifically sound and realistic fashion. Ultimately, management recommendations will be understood and supported by the community, and have practical application for regulatory agencies.

Significant contributions have been made by partner agencies within the Task Force structure or directly involved in the cumulative impact analysis of the Yellowstone River system. Those contributions, shown in *Tables 3* and *4* in the previous section, have been the building blocks for success throughout this project.

Upper Yellowstone River Landowners—Upper Yellowstone River landowners are to be praised for their support and cooperation. In addition to donating their time as Task Force members or by attending Task Force monthly meetings, more than 500 private landowners have allowed six Task Force research teams to access their properties to collect data over the past three years. The Task Force could not accomplish a scientifically based investigation without their support, patience, and trust, and we owe the local citizens great thanks. The data collected accurately represents the entire upper Yellowstone study area, which benefits us all in Montana.

Full Yellowstone River Cooperation—One other notable development in 2001 has been the strengthening cooperation between the Task Force and the Yellowstone River Conservation District Council (YRCDC). In the past year or so, these two groups have made every attempt to share information and work together to benefit all citizens along the Yellowstone River.

The YRCDC was formed in 1999 out of a concern for the Yellowstone River corridor by the adjacent conservation districts. The YRCDC's purpose is to provide local leadership, assistance, and guidance for the wise use and conservation of the Yellowstone River's natural resources. In much the same way as the Task Force, the YRCDC is working closely with the Corps on a cumulative effects assessment of the Yellowstone River. Given that the Task Force is already intensively studying the upper river, the YRCDC is focusing their efforts on the middle and lower Yellowstone. The Task Force chair and coordinator have been invited to participate in the developmental stages of the YRCDC river study plan, to insure that the two river studies complement each other as much as possible and to exchange technical information. The Task Force fully intends to continue to provide assistance to, and share data with, the YRCDC until our study completion in 2003.

Outreach and Education

Landowner Permission

Because the vast majority of land adjoining the upper Yellowstone River is privately owned, the Task Force feels that it is crucial to keep the public continually informed of our investigations and actions along the river. In 2001 alone, we contacted approximately 200 private landowners asking permission to access their properties to collect data for four investigative studies. Most of those contacts were by phone, although more than 100 permission letters were also sent out. Securing access to collect data was the main purpose for these communications; however, we also used the opportunity (1) to inform property owners about specific study objectives and timelines, (2) to educate them about our overall Cumulative Effects Investigation, and (3) as a community outreach effort, which allowed them the opportunity to ask questions about the Task Force or comment on our river corridor effort.

Obtaining landowner permission will continue for one more year, with our final field data collection work occurring from March to October 2002.

Workshops and Tours

Educational tours and workshops are an important component of our public outreach. In addition to providing technical information to participants, these events also provide an opportunity for local residents to interact with our research team members. Fostering communication in this way helps to build trust and allows individuals to learn more about each other and to learn from one another.

March 3, 2001
Upper Yellowstone River Workshop—As a greater number of research teams entered the field in 2000 and 2001, the Task Force began to receive requests from landowners along the river to better explain our cumulative effects investigation and update them on project progress.

In response to those requests, the Task Force sponsored a project overview workshop, entitled: *Upper Yellowstone River, What the heck is the Task Force up to*? We asked all of our research team leaders to come and talk about their studies, and to be available to answer the public's questions. It was our intent that this workshop would: (1) give the public a chance to get to know the Task Force and our research teams better, (2) help the public understand why and how we are conducting scientific studies in the upper Yellowstone, and (3) give everyone a chance to get involved in the effort. In addition to presenting detailed information on each of our seven main research investigations, our TAC chair, Dr. Duncan Patten, also reviewed basic principles of riverine systems or "how rivers work," and explained the interactions between the studies.

The workshop was held on March 3, 2001, from 9:00 am to 3:00 pm at the Yellowstone Inn in Livingston. There were more than 50 participants. The Task Force and MSU Montana Watercourse worked collaboratively in hosting and funding this event.

The response to each of the more than 10 presenters, and the workshop overall, was overwhelmingly positive. The *Questions and Discussion* sessions following each presentation were stimulating and enlightening for the public, Task Force participants, and researchers. Lunch was provided by the Task Force, at which time the audience was encouraged to visit informational tables where researchers answered questions and provided hands-on materials from their investigations.

Photo 26. Task Force March 3rd educational workshop.

May 5, 2001

Upper Yellowstone River Demonstration Workshop—Building upon the success of the March 3rd workshop, a follow-up demonstration workshop was held by the Task Force on May 5, 2001. The workshop was held outdoors, at five designated research sites along the river. The purpose of this on-site workshop was to: (1) explain what information the research teams have been collecting in the study area, (2) demonstrate data collection techniques, and (3) answer questions from the public. Presentations were given by Dr. Duncan Patten and six research team leaders (fish studies, riparian vegetation, bird study, geomorphology, and hydrology).

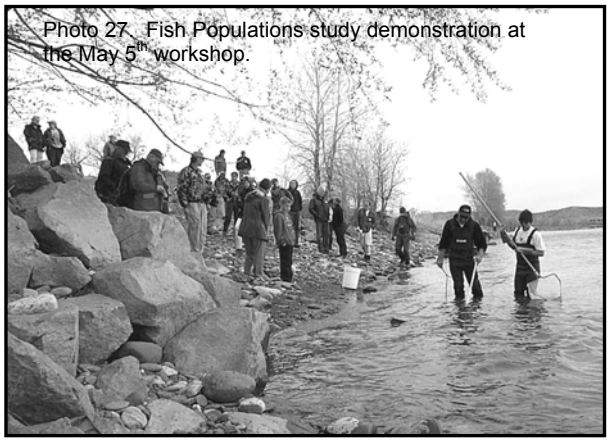


Photo 27. Fish Populations study demonstration at the May 5th workshop.

The workshop was an all day event—9:00 am to 3:30 pm—with more than 40 people attending. Once again, the workshop was hosted and funded by the Task Force and MSU Montana Watercourse. Yellowstone National Park also donated the use of their commuter bus in order to transport participants to and from workshop demonstration sites.

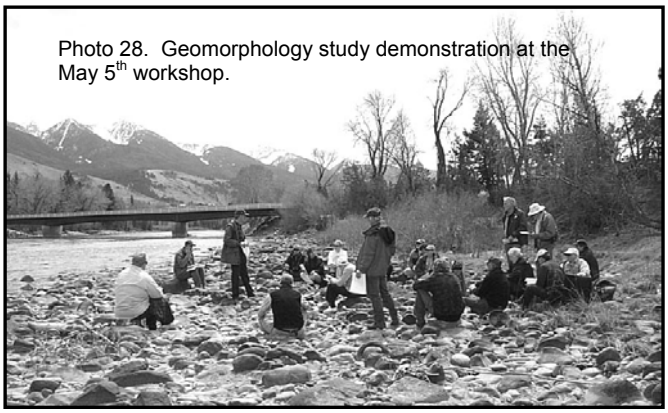


Photo 28. Geomorphology study demonstration at the May 5th workshop.

Workshop evaluations were very positive; all of the presentations were ranked as excellent or good. In particular, workshop participants most enjoyed the cottonwood demonstration that "put the present situation in historical context [and] was essential to understanding river dynamics and the nature of change in the river system." Others also enjoyed riding on the bus, which enabled them to discuss topics of special interest with the specialists.

Yellowstone Tours—The Task Force hosted two river tours in 2001. The Task Force chair, John Bailey, and other Task Force members donated their time and energy to make these events informative, visually revealing, and pleasant for our guests. Tour groups included: (1) the Corps Omaha and Congressional Office of Budget & Management on June 25, and (2) the Socio-Economic Subcommittee and DEQ staff on August 15.

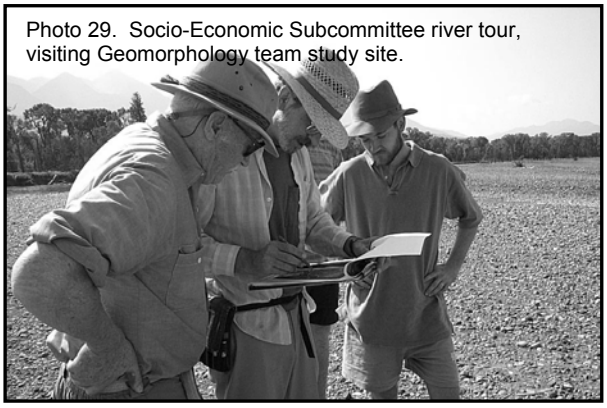


Photo 29. Socio-Economic Subcommittee river tour, visiting Geomorphology team study site.

Community Outreach

The Task Force was invited to do nine formal presentations on the Upper Yellowstone Cumulative Effects Investigation in 2001. John Bailey and Liz Galli-Noble co-presented on two occasions in April: at the Yellowstone River Conference in Billings and Montana Watershed Coordinator Council in Helena. In addition, the coordinator and three research team leaders presented study updates at the American Fisheries Society annual meeting in Butte in January. Finally, the Task Force coordinator also gave project presentations to the following groups: (1) Bozeman's Chief Joseph Middle School, (2) USGS NAWQA Conference, (3) Cumulative Impact Analysis/NEPA Workshop in Omaha, (4) Billings Conservation Roundtable, (5) MSU Landscape Architecture senior-level class, and (6) Cascade County Conservation Council.

Appendices

Appendix A. Acronyms

Task Force	Governor's Upper Yellowstone River Task Force
BLM	Bureau of Land Management
Corps	US Army Corps of Engineers
DEQ	Montana Department of Environmental Quality
District / PCD	Park Conservation District
DNRC	Montana Department of Natural Resources and Conservation
DNRC-CARDD	DNRC-Conservation and Resource Development Division
DNRC-WMB	DNRC-Water Management Bureau
DNRC-WRD	DNRC-Water Resources Division
EPA	Environmental Protection Agency
ESRI®	Environmental Systems Research Institute, Inc.
FWP	Montana Department of Fish, Wildlife, and Parks
FY	Fiscal Year (used by the federal government: October 1 to September 30)
GIAC	Geographic Information and Analysis Center, Montana State University
GIS	Geographic Information Systems
GPS	Global Positioning System
GYC	Greater Yellowstone Coalition
GYE	Greater Yellowstone Ecosystem
HB 223	House Bill 223 Grant (DNRC)
MDT / DOT	Montana Department of Transportation
MSU	Montana State University
MTCFRU	Montana Cooperative Fisheries Research Unit (MSU)
NEPA	National Environmental Policy Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRIS	Natural Resources Information System
NWI	National Wetland Inventory (USFWS)
RDGP	Reclamation and Development Grant Program (DNRC)
RFP	Request For Proposal
SAMP	Special Area Management Plan
Start Up	Task Force Start Up Grant (DEQ)
TAC	Technical Advisory Committee
TNC	The Nature Conservancy
U of M	University of Montana
USDA	US Department of Agriculture
USDI	US Department of the Interior
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
USGS-BRD	USGS-Biological Resources Division
WPA	Watershed Planning and Assistance Grant (DNRC)
YNP	Yellowstone National Park
YRCDC	Yellowstone River Conservation District Council
319 Grant	Section 319 Water Quality Grant (DEQ)

State of Montana
Office of the Governor

Executive Order No. 21-01

EXECUTIVE ORDER CONTINUING THE
GOVERNORS UPPER YELLOWSTONE RIVER TASK FORCE

WHEREAS, the upper Yellowstone River and its tributaries, herein defined as that reach of the river (including tributaries) beginning at the Yellowstone Park boundary and extending downstream to the bridge crossing the river at Springdale, is a national treasure; and

WHEREAS, the recreational opportunities provided by the river provide significant contributions to Montana's economy; and

WHEREAS, the river is essential to Montanans who live along it, providing water for agricultural, domestic and commercial purposes; and

WHEREAS, the extreme floods of 1996 and 1997 created hardships for communities and Montana citizens who live adjacent to the river, causing damage to property and stream banks, as well as some nationally-renowned spring creeks in Paradise Valley; and

WHEREAS, previous decades of work done along the river for

purposes of flood control, construction of transportation corridors and other purposes have altered the natural flood plain of the river, with the potential to exacerbate damage to private and public property and fish habitat; and

WHEREAS, there is a need for a more comprehensive planning effort involving citizens, communities, and government agencies that have an interest in the upper Yellowstone River to ensure that future projects that affect the river are planned and conducted in a manner that will preserve the integrity, beauty, values, and function of the upper Yellowstone River for Montanans now and in the future.

NOW THEREFORE, I, JUDY MARTZ, Governor of the State of Montana, by virtue of the authority vested in me, do hereby continue the Upper Yellowstone River Task Force.

I. PURPOSE

A. The Upper Yellowstone River Task Force shall:

1. Provide a forum for the discussion of issues that effect the Upper Yellowstone River basin, particularly, to bring together landowners, sportsmen and sportswomen, and community leaders to develop a shared understanding of the issues and competing values and uses that impact the Upper Yellowstone River;

2. meet on a regular basis, the frequency to be determined by Task Force members, for the purpose of encouraging a comprehensive approach to action taken

along the Yellowstone River to ensure that its integrity remains intact while balancing the needs of communities and landowners to protect property;

3. seek or encourage others to seek grants, funds or other cooperative arrangements to implement recommendations of the Task Force; and

4. prepare an annual report to the Governor on the progress of the task force.

II. COMPOSITION

The Upper Yellowstone River Task Force shall be composed of no more than 12 voting members including representatives of the following: local businesses, property owners, farmers and ranchers who live along the river, the angling community, a conservation group or groups, Park County, the City of Livingston and the local Conservation District. Representatives of the Army Corps of Engineers, Departments of Natural Resources and Conservation, Environmental Quality, Fish, Wildlife & Parks, and Transportation shall serve as ex-officio members.

III. DURATION

This Task Force shall remain in existence for two years from the date of effect unless extended or terminated by subsequent Executive Order.

This Order is effective immediately.

GIVEN under my hand and the GREAT SEAL of the State of Montana, this 21st day of August, 2001.

JUDY MARTZ, Governor

ATTEST:

BOB BROWN, Secretary of State

Appendix C. Governor's Upper Yellowstone River Task Force Ground Rules

1999 – 2001 Term

Participation

1. The discussions of the Upper Yellowstone River Task Force will include the perspectives of individuals and organizations whose interests may be affected by the recommendations or activities of the Task Force.

   Voting Task Force members represent the following interests:

- Local businesses
- Property owners
- Ranchers
- Angling community
- Conservation groups
- Park County
- City of Livingston
- Park Conservation District

Ex-officio members of the Task Force represent the following government agencies:

- Montana Department of Environmental Quality
- Montana Department of Fish, Wildlife and Parks
- Montana Department of Natural Resources and Conservation
- Montana Department of Transportation
- US Army Corps of Engineers
- National Park Service—Yellowstone National Park
- US Forest Service—Livingston Ranger District
- US Forest Service—Gardiner Ranger District

The Task Force will actively encourage the inclusion of a variety of perspectives in the following ways:

a) Members will candidly identify and share their values and interests and will do so as soon as possible.

b) Members will inform their constituency of the activities of the Task Force, seek the advice of their constituency and make every effort to speak for their constituency.

c) The Task Force will invite individuals with perspective not represented by members to discuss their views with the Task Force.

d) Task Force meetings will be open to the public. Individuals may request time on the Task Force agenda to discuss their concerns.

e) Notice of meetings will be provided to the news media.

f) A mailing list will be established and, upon request, individuals will receive notices of upcoming meetings and summaries of previous meetings.

g) The Task Force will hold special meetings at different locations, when needed, to share information and gather ideas, comments and concerns about Task Force proposals.

h) The Task Force will periodically prepare a summary of its activities and distribute this summary to the news media and individuals on the mailing list.

i) Task Force members agree to make every effort to attend every meeting. If a member is unable to attend a meeting, he or she may make arrangements for an alternate to attend the meeting, but should ensure that the alternate is fully informed of the issues under consideration and progress to date.

Decisions/Agreements

1. The Task Force will seek consensus agreements regarding policy decisions and recommendations. Consensus is defined as acceptance of an agreement. Members may not agree with all aspects of an agreement; however, they do not disagree enough to warrant opposition to the agreement. When Task force members accept an agreement, they commit themselves to implementing the agreement.

2. Participants who disagree with a proposal are responsible for offering a constructive alternative that seeks to accommodate the interests of all other participants.

3. Business or monetary decisions may be made by a voice vote of a majority (seven voting members) of the Task Force. The Chair may vote.

Communication with the Media

1. The Chair will be the spokesperson for the Task Force in communications with the media.

2. Each participant is free to speak to the media regarding their own view on the work of the Task Force. No participant may characterize the views of other participants expressed in this process to the media or in other forums.

3. With the exception of notices of meetings or events, written statements distributed to the news media will be reviewed by the Task Force.

Roles and Responsibilities

1. The Task Force Chair, will serve as the contact person for the Task Force and liaison with government agencies. The Chair, with the consent of the Task Force, is responsible for conducting and calling meetings, clarifying voting issues and appointing subcommittees, and providing direction to the Task Force Coordinator.

2. The Vice-Chair will assume the duties of the Chair in his absence.

3. The Coordinator will: help the participants design an appropriate process; coordinate pre- and post-meeting logistics; prepare documents to maintain an objective record of the process, including meeting summaries and annual and final reports; distribute agendas and meeting summaries; encourage everyone to participate; and moderate discussions as needed. The Coordinator is nonpartisan and is not an advocate for any particular interest or outcome.

Technical Advisory Committee

The overall goal of the Technical Advisory Committee (TAC) is to provide recommendations to the Task Force when requested based on the results of the scientific investigations. The TAC is given both broad direction and specific missions by the Task Force, and has the flexibility to determine how best to accomplish its job. The TAC has no authority to make policy decisions or recommendations on behalf of the Task Force; its role is to work as directed by the Task Force to ensure:

- The right questions are asked;
- The best approach and methods are used to answer questions;
- The data collected are objective, defensible, and trustworthy; and
- The answers provided are understandable and relevant.

Appendix D. US Army Corps of Engineers, Regulatory Guidance Letter 86-10

SUBJECT: Special Area Management Plans (SAMPS)

DATE: October 2, 1986 EXPIRES: December 31, 1988

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1. The 1980 Amendments to the Coastal Zone Management Act define the SAMP process as "a comprehensive plan providing for natural resource protection and reasonable coastal-dependent economic growth containing a detailed and comprehensive statement of policies, standards and criteria to guide public and private uses of lands and waters; and mechanisms for timely implementation in specific geographic areas within the coastal zone." This process of collaborative interagency planning within a geographic area of special sensitivity is just as applicable in non-coastal areas.

2. A good SAMP reduces the problems associated with the traditional case-by-case review. Developmental interests can plan with predictability and environmental interests are assured that individual and cumulative impacts are analyzed in the context of broad ecosystem needs.

3. Because SAMPs are very labor intensive, the following ingredients should usually exist before a district engineer becomes involved in a SAMP:

a. The area should be environmentally sensitive and under strong developmental pressure.

b. There should be a sponsoring local agency to ensure that the plan fully reflects local needs and interests.

c. Ideally there should be full public involvement in the planning and development process.

d. All parties must express a willingness at the outset to conclude the SAMP process with a definitive regulatory product (see next paragraph).

4. An ideal SAMP would conclude with two products: 1) appropriate local/state approvals and a Corps general permit (GP) or abbreviated processing procedure (APP) for activities in specifically defined situations; and 2) a local/state restriction and/or an Environmental Protection Agency (EPA) 404(c) restriction (preferably both) for undesirable activities. An individual permit review may be conducted for activities that do not fall into either category above. However, it should represent a small number of the total cases addressed by the SAMP. We recognize that an ideal SAMP is difficult to achieve, and, therefore, it is intended to represent an upper limit rather than an absolute requirement.

5. Do not assume that an environmental impact statement is automatically required to develop a SAMP.

6. EPA's program for advance identification of disposal areas found at 40 CFR 230.80 can be integrated into a SAMP process.

7. In accordance with this guidance, district engineers are encouraged to participate in development of SAMPs. However, since development of a SAMP can require a considerable investment of time, resources, and money, the SAMP process should be entered only if it is likely to result in a definitive regulatory product as defined in paragraph 4 above.

8. This guidance expires 31 December 1988 unless sooner revised or rescinded.

Rear Cover Photo. Upper Yellowstone River in southern Paradise Valley.

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